MEDIZINISCHE AUSBILDUNG

AMEE ANNUAL CONFERENCE

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MEDIZINISCHE AUSBILDUNG

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Session III: Scientific Thinking in Medical Education - Evaluation and Other Aspects -

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VORWORT

Dieses Heft enthält alle verfügbaren Beiträge zur Jahreskonferenz der Association for Medical Education in Europe (AMEE) vom 5. bis 8. September 1989 in Münster. Dabei handelte es sich um die erste Jahreskonferenz, welche in der Bundesrepublik Deutschland stattfand.

Das Thema der Konferenz lautete: Scientific Thinking in Medical Education. Der letzte Tag war einer gemeinsamen Veranstaltung der AMEE und der IV. Jahrestagung der Deutsch-Chinesischen und Chinesisch-Deutschen Gesellschaften für Medizin (Präsidenten: Prof. Dr. F. H. Kemper und Prof. Dr. Dr. h.c. QIU Fazu) gewidmet. Die Themen der einzelnen Beiträge ergeben sich aus dem Inhaltsverzeichnis.

Unser Dank gilt zunächst allen Autoren und Teilnehmern an dieser Jahreskonferenz, darüber hinaus aber auch allen denen, die bei der Anfertigung dieses Heftes tatkräftig mitgewirkt haben. Von ihnen sollen hier die Damen Erika Foitzik, Sabine Herbst, Maria Hoeltzenbein und Heidi Walsh sowie Herr Dr. Tassos Ladas besonders genannt werden.

PREFACE

This booklet contains all the available contributions from the annual conference of the Association for Medical Education in Europe (AMEE), held in Münster September 5 - 8, 1989. It was the first AMEE annual conference to be held in the Federal Republic of Germany.

The topic of the Conference was "Scientific Thinking in Medical Education". The final day of the Conference was dedicated to the AMEE and the IV annual meeting of the German-Chinese/Chinese-German Medical Societies (Presidents: Prof. Dr. F. H. Kemper and Prof. Dr. Dr. h.c. QIU Fazu). The topics of the individual contributions can be found in the table of contents.

We would like to thank all the authors and conference participants, and all those who intensively worked on this booklet. Special mention goes to Erika Foitzik, Sabine Herbst, Maria Hoeltzenbein, Heidi Walsh and Dr. Tassos Ladas.

Im Namen der Redaktion
On behalf of the editors Dietrich Habeck

AMEE ANNUAL CONFERENCE MÜNSTER (FRG) 1989

OPENING CEREMONY

AMEE in Münster 1989: Medical Education Today and Tomorrow

Prof. Gunnar Ström, MD, DMS, FRCP
Edin, Chairman of AMEE

The Association for Medical Education in Europe has assembled in Münster, Federal Republic of Germany to hold its annual conference of 1989 and to try to achieve its purpose, which is to promote the study of medical education and to foster communication among medical educators in the countries of Europe. Any success of our endeavours will be due to the work of the individual participants of this Conference and to the members of AMEE.

Medical education is closely related to the practice of medicine in health care. At the European level, this is borne out by the close relationship and mutual support between AMEE and WHO in the form of its European Office. WHO has inspired through great ideas and achieved unique practical improvements for health all over the world. A symbol for much of its present work is the struggle for Health for All by the year 2000, and the consequent priority for primary care. For Europe, it was an important step forward when the new European health-for-all policy was adopted in 1984 by the European WHO Regional Committtee, and a number of targets were formulated to make development more realistic. This policy was later accepted by national governments, and therefore is a model to which medical education in all these countries has to be adapted. The adaptation will depend mainly on medical schools, universities and educators, their interest, creativity and strength of action, and of course, their loyalty to the policy of their own country. But medical schools and educators must exercise critical analysis and evaluation as well, and we have to realise that there exist several alternative ways in which to reach the goals of the policy. Therefore theory (medical schools) and practice (health authorities) above all must cooperate for the common good, and all engaged shall have to adapt their opinions and plans to emerging new knowledge and experience. AMEE conferences are one of the places where such cooperation takes place.

The initiative of the World Federation for Medical Education, so brilliantly led by our former president of AMEE, Professor Henry J. Walton, Edinburg, resulted in the Edinburg Declaration of 1988, and the Lisbon Initiative and other regional meetings between governments, WHO and educators. The stage is now set for practical implementation of reforms. The reforms aim at improving the quality and relevance of health care. It may then often be suitable to start by experiments on a smaller scale, closely assuring quality and refining methods, and later continue with large scale changes. This will take time. So much more important, therefore, that we all start now. AMEE will contribute inter alia through its working group on health policy and medical education, chaired by Professor Alberto Oriol Bosch, Barcelona. This group will present its work regularly at forthcoming AMEE conferences.

We probably all intuitively agree on the importance of the quality of medical education for the quality of medical care and health care. But we also understand that the quality of health care depends on more factors than education. It may be useful to look for a moment at the wholeness of care and its determining factors. They may be ordered as follows, in a simplified way, into six main areas.

1) Nature, new diseases, population demography, climate, etc.
2) Population, culture, and the needs, demands and expectations of people.
3) External factors, resources, organisation, rules, salaries and incentives, buildings, equipment, etc.
4) Professionalism and inner factors, the self-developed standards of quality of care personnel, leadership, relevance of measures, traditions, peer review and quality control, specialisation, use of technology, instruction of newcomers, empathy, ethics and moral behaviour, communication, etc.

5) Recruitment and education of care personnel.
6) Research and development.

It is the areas of professionalism, education and research that today are at the center of interest to medical shcools, professional associations/societies and educational groups (such as AMEE), since these areas can be more influenced by our own decisions and actions than other areas. There are a number of critical issues, such as methods of selection of students and teachers, development of leadership, degree and type of specialisation, technology assessment, quality assurance, continuing education, affective atmosphere and empathy, etc., and the whole combination of reforms of the Edinburg Declaration.

In many of our countries today, there are problems of health care which may even in some cases amount to a crisis (defined as a state of serious alarm whose causes and cures are not well-known). Reforms of education are usually therapeutic in such states but seldom enough: Efforts to improve professionalism and broaden research may also be needed. This emphasizes the fundamental need for cooperation between medical schools, educational groups and professional associations, and also the need for the interest of authorities in "inner factors", education and research.

It is generally agreed that one basic goal of medical education is to produce physicians/health personnel with adequate competence to give good health care. Professional competence includes knowledge, the use of knowledge, skills, attitudes and behaviour, experience. But it is a classical fact that medical education, like any other university education, has two more basic goals in scientific thinking and personal development. The three goals combine in reality, at least in medical education of good quality. This year's AMEE Annual Conference has chosen "Scientific Thinking" as its main topic because of its importance and because of criticism sometimes heard (as at the AMEE conference in Nijmegen) that not even basic subjects as anatomy or physiology always give due consideration to training in the principles and methods of science.

Personal development as part of medical education was discussed at the AMEE conference in Jerusalem. The definition of this concept is an important first step, to be followed by a discussion of objectives, methods and results. This was included in the AMDE conference preceding the present AMEE conference. Perhaps personal development is worthy of a more thorough discussion at some forthcoming conference.

The personal development of a student during his/her basic education period, and after, could include considerations of the student's personal health, awareness, life habits, etc. - certainly not to force any opinion or habit on the student but to give him/her the opportunity to reflect on the concept of health and the function of one's own body, physical, mental and social. A now classic definition of health was given by WHO early, as a state of complete physical, mental and social well-being, and not only the absence of disease and infirmity. This definition has been criticized as overwhelming and utopian, mainly because the word "complete" has been interpreted as "maximal". If "complete" is instead interpreted as "combined", i.e., not only physical but also mental and social, and well-being is meant to represent a long-term steady state, the WHO definition could be useful. As pointed out earlier by others, well-being may be meant to represent not only the subjective feeling "to feel well", but also a functional state "to function well" (take care of oneself and of one's daily job), and perhaps also a good environment. If a student gets the opportunity and motivation to reflect on his/her own personal health in this way, and try the effect of different life habits, he/she will probably better understand the measures for protection and promotion of health and prevention of ill-health, which are included in health care.

In our societies, research has now taken an accepted place as the strongest mechanism for development of technology and (if properly used) culture. In my own country, Sweden, research is said to spend about 3% of our gross national product at present, while health care takes about 9%. Our general policy is that every branch of society needs knowledge based on scientific grounds. In addition, it is accepted that professionals need continuing education to keep up with development. And every medical discipline, be it physiology or surgery, has lively international contacts with visits and conferences which can be paid through existing grants or foundations. We may wonder why this state has not yet come to characterize medical education. There are but few grants for educational research in medicine, at least in most countries. There is only little formal study/education in educational

principles/methods for medical teachers, and even less continuing education in the field. And international the exchange of educators or young teachers under training is made difficult by a lack of channels for grants.

The role of educator usually takes about one-third of a medical professor's time, clinical services and administration taking the rest. It is perhaps time to consider the role of educator as equally important as the other roles, and plan research, continuing education and international contacts accordingly.

AMEE has an important purpose but a sparse budget. AMEE would like to expand certain of its ambitions, such as to promote international contacts between educators and young teachers, to function as a clearing house for material on objectives, examinations, curriula, and programmes, to organize special annual conferences, to support the development of European centers of excellence within medical education, to offer external examiners or evaluators to nations who ask for them, to document and review methods of medical education, to keep registers of educational research and researchers in Europe and elsewhere, etc. It seems that AMEE ought to consider new ways to make it possible to expand activities in this way. All AMEE members are invited to contribute to this discussion.

To end, an AMEE conference must not only be scientific and useful, but also pleasurable, stimulating and joyful. Our hosts have done their best, which is much indeed, to prepare this conference for its double role. Let us thank them warmly and reciprocate by demonstrating clearly our educational well-being.

Welcoming Speech from the President of the Gesellschaft für Medizinische Ausbildung (German Section of the AMEE)

Professor Dr. D. Habeck, Münster, RFG

It is a great pleasure for me to welcome you here to the AMEE Annual Conference in Münster. It is the first AMEE Conference in the Federal Republic of Germany. I am therefore delighted to welcome so many illustrious participants, and among them the foreign guests, especially the great number of Polish and Czech colleagues.

Last but not least, I am very happy to welcome so many students. Some of them, if not all, will be the future teachers in medical education, and I hope that by the time they are professionals, medical education will be better appreciated than it is at present in several countries, including my own.

Medical education is often oriented to the ideas and meditation of individual professors and the reputation of various disciplines and specialties. Teaching is also widely regarded as an inborn gift, and systematic investigations and research in medical education are mostly not understood as a challenge for its development and as a scientific matter.

Scientific thinking in medical education is the main theme of this conference. The President of our Association, Prof. Gunnar Ström, has given us his reflections on this subject. They have been published in our journal "Medizinische Ausbildung". I believe that his explanations will be a good basis for our work, so that this conference will be a fruitful one.

We have reduced the participant's fee by about half, in comparison with previous AMEE conferences, and have allowed students to attend the conference free of charge. You may therefore miss some comforts, such as bus shuttles from the hotels, and cultural events.

Let me now come to the programme. A video will be added to the topic "learning biographical history-taking in peer groups" on Thursday at 1 o'clock. The video was produced by German students. In addition you can visit our Mediothek upstairs and the thorax trainer, two components of our Münster Model. These and other elements, such as the use of simulated patients, are described in the yellow 1989 AMEE brochure, including the integration on non-university hospitals, based on experiences in Bern, Lille, Kraków and Southampton. You will have the opportunity to visit one of these non-university hospitals on Friday under the optional excursion programme.

I would now like to thank all chairmen, speakers, and those colleagues who presented posters of their contributions to this conference. I would like to ask you for your manuscripts so that they can be published in the final report of this conference, just as Professor Taner was able to do with the proceedings from the last conference in Istanbul. You will find a list of them in the abstract booklet.

Finally, my thanks to our President, Professor Gunnar Ström, and Professor Fritz Kemper, and to all those in the Institut für Pharmakologie and Toxikologie and the Institut für Ausbildung and Studienangelegenheiten for the excellent cooperation in planning, preparing and accomplishing this conference.

Thank you very much.

OPENING SPEECH

Professsor Dr. F.H. Kemper,
Direktor, Institut für Pharmakologie und Toxikologie, Münster,
President, Medizinischer Fakultätentag FRG.

It is an honour and privilege to welcome you to Münster on behalf of the Medizinischer Fakultätentag (MFT), the Association of all Medical Faculties of the Federal Republic of Germany. We are much obliged to be your hosts in Münster during the Annual Conferences of AMDE/AMEE.

Last year the 75th Anniversary of the MFT - founded in 1913 in Halle, now in the German Democratic Republic - was celebrated in this town. In a historical review over these three quarters of a century, it became obvious that problems have remained the same over time, but have appeared in a different outlook according to the momentary fashion.

One of the special problems today in the FRG is the enormous number of young people applying to study medicine, which some years ago led to the introduction of a "numerus clausus". But in spite of these means of intended regulation, there are more than 10,000 unemployed doctors today, mostly of young age, and in addition the universities are overcrowded.

Our demand is to improve the quality standards of medical education, especially in the practical exercises which should be performed in small groups of two to four students. This is impossible today with, for example, 550 students per year as in Münster on the one hand, and a limited number of suitable patients on the other.

Making more use of teaching hospitals may be one way to solve the problems. We tried to do so in the "Münster-Modell" which was originated by Professor Habeck, but it is unrealistic to expect that suitable hospitals are at the disposal of all medical faculties, even in the FRG. Thus the quality of medical education can only be increased when the number of incoming students is reduced.

Another important demand is to gain more personal and financial support for research, which normally should only be supplied by the university, to an extent of basic necessities which enables the researching scientist to apply for other sources and grants from outside the university. But it should be made very clear that the "university part" is guaranteed, and not a sacrifice of or better for teaching purposes.

Problems within the medical faculties in the 34 states under supervision of the WHO-European Office are very different, beginning with the different systems of organisation. Reasonable numbers of medical faculties do not belong to universities but are organized as Medical Schools or Medical Academies. The budgets are also handled in different ways by the medical faculties themselves or by the university administration.

Many viewpoints are worth analysing as to the developments of medical science as well as medical education and its impact on medical faculties and medical schools. Where to begin, or indeed to see whether a start has been made, will be a matter of discussion for AMEE, leading to recommendations.

Let me mention one final point in these opening remarks, which was also a topic in one of the workshops this morning: "Ethical Considerations in Research". From my point of view it seems to be a very important item which should be harmonized between the members of AMDE/AMEE.

I hope you will enjoy this highly appreciable town of Münster with its more than 1000 years of history, and that you will profit from the AMDE/AMEE Annual Conference.

My co-workers, to whom I am deeply indebted and grateful for their cooperation, and I will do our best to make your stay in Münster an agreeable one.

Message of Greeting by the Minister of Labour, Health and Social Affairs of Northrhine-Westphalia, Hermann Heinemann, Düsseldorf, presented by Dr. Erdmann, Leitender Ministerialrat

It is an honour and pleasure for me to extend the warmest greetings to you from the government of NRW and particularly from the Minister of Health, Hermann Heinemann.

We are delighted that it has been possible to organize this important conference here in Münster. It is well timed, because the issue and the problems of medical education in the Federal Republic and elsewhere are presently focussed in the area of health and general education policies, leaving behind increasingly more academic discussion. Also, medical education has been linked to social policies, insofar as not only the quality of medical education is of importance, but also its relevance to the needs of a modern society.

The extremely rapid development of scientific progress in medicine has to be coped with increasingly by adequate learning and controlling strategies. The capacity and ability of the medical faculties have to cope with this and with the still too high numbers of medical students.

All these issues reflect a situation which we all have to face: The doctor - his/her actions and attitudes - in our societies has entered into a crisis. The amount of any biomedical knowledge has grown to be no longer contained in one medical education.

The demographic situation in our industrial world requires new priorities, both in the educational system, and also in the new definition of the role of a generalist doctor in our social security system.

A changing panorama of diseases requires a change in the role of a doctor and in preparation of this different education, now required. Active learning has to be introduced into the doctor's profession. Postgraduate training cannot any longer be regarded as merely voluntary activities in a doctor's professional life. We in the Federal Republic still have a system in medical education which concentrates too much on aggregation of specific topics.

Integrated approaches which include social and economic as well as medical aspects of health and illness have been neglected in the past. The learning base should remain scientific, but coordination and integration are necessary. We have to achieve a 5-year medical education without loss of quality. Only a shortened medical education period justifies a compulsory postgraduate training period as a legal entry point in the social assurance system.

All these questions have been activated by the need to introduce the EC-guidelines into national legal regulations. The EC-guidelines stipulate a minimum of a 2 years training phase in general medicine, before entry in the social system is permitted.

We regarded it as necessary that this period should be extended to a 3-year period. But again, this can only be justified if basic medical training is limited to 5 years. So we have started preliminary work to bring about this change, though I am sceptical whether students will pass their examinations in such a changed arrangement before the year 2000.

I have to add that such changes can only be achieved if we succeed in a reduction of the numbers of students admitted. I should not forget at this point to thank the medical faculties for having coped so far with the overcrowding of students in our universities.

Ladies and Gentlemen, the results of your working programme are regarded as very important for decision-makers. On behalf of the Government of NRW I wish you successful personal work and relaxing conditions in order to achieve these results. Good luck.

Welcoming Speech from the Rector of the University of Münster

Rector Magnificus Prof. Dr. H. U. Erichsen

It is a pleasure for me to welcome you on the occasion of your annual conference here in Münster to this University. We are proud that the Association for Medical Education in Europe, as well as the Association of Medical Deans, decided to hold their conference this year in this University town. Referring to what has been said already,let me mention a significant pattern in my point of view as far as medical education is concerned. That is that medical students intend to change or to integrate a study abroad with their academic education. One of your workshops will be dealing with this subject which has now become very important to all faculties. The year 1992 was fixed by the European Community as a sort of deadline to accomplish the requirement of an integrated Common Market. Such integration means as far as the academic sector is concerned, introducing measures in order to allow everybody to live in a member country in the European Community and to obtain academic education wherever he or she wants to.

The international impact on medical education at this University has a long tradition. This University has entered into medical related partnerships and similar agreements with the Universities of Lille II, Twente Enschede, Santo Tomös in Bogota, Colombia, Rio Grande do Sul, Porto Alegre, Brazil, Oviedo in Spain, with the Osaka Medical College, with Monastir in Tunesia, with Krakow in Poland and other Medical Faculties and Medical Schools.

The experiences of an Medical Department or Faculty will serve as a model for younger disciplines facing the challenge of the European Community.

In some disciplines, I do not know whether in Medicine, the model of an integrated study is now being discussed. This means that some students of one university go to a foreign partner university, where they study one year with full recognition of credits. Some disciplines are even contemplating the mutual conferring of academic degrees. Thus those students would obtain two equivalent degrees after having finished their studies by passing their final examination.

Unfortunately it has become very difficult for our students in the Federal Republic of Germany to plan their studies since different reform drafts in respect to the act regulating the admittance to the medical profession are now being discussed. It is very difficult if not impossible to recognize a guarding line in this dicussion although a regulation in the European Community requires implementation of certain standards by 1990. Therefore we hope that the present Conference on medical education will have the effect of bringing forward the discussion of medical educaton in the Federal Republic.

The Medical Faculty of this University and I would like to stress that the Medical Faculty is an integrated part of the University. It now has an enrollment of over 5000 students, making it one of our largest departments. Affiliated to the Faculty is one of the biggest university hospitals in the Federal Republic of Germany. The "Bed-Towers", which were completed in 1982, have already become a landmark of this town. This "Klinikum", which we are in now, provides top medical service to more than 400,000 inhabitants of the Northwest German region. The central building has a capacity of over 1000 beds and in addition, more than 700 beds are available in the other, much older (approx. 60 years old) buildings of the "Klinikum".

I hope that your schedule, which seems to me to be already rather full with sessions, discussions, and other features will leave you the chance to at least take a look at some parts of our Klinikum. Perhaps you will also have the chance in the next few days to visit the centre of Münster with the Cathedral and its old buildings in the Prinzipalmarkt.

I wish you all the best for your stay here in Münster. I hope that you will profit from this conference and that your discussions will contribute to the efforts to improve international cooperation in Medical Education, which will help us all to face the challenges of the future.

Thank you.

Welcoming Speech from the Dean of the Faculty of Medicine, Münster

Prof. Dr. E.-J. Speckmann,
Vice Dean, Faculty of Medicine, Münster

The Dean of the Medical Faculty, Professor Dr. Ute Witting, has asked me to take her place in this opening ceremony, and I do so with pleasure.

Since I myself have often suffered from the long welcoming remarks of colleagues of mine, I will restrict myself to the expression of only one idea I personally feel strongly about. The greatest need in medical science is, in my opinion, the strong collaboration between experimental and clinical scientists. Only when the colleagues who are working in the experimental labs and the colleagues who are engaged in everyday medical practice pay attention to each other, will it be possible to really transfer the results from the labs into the clinics and to stimulate the scientists in the labs with everyday clinical experience. I believe this is the basis and the only way for an improvement in medical science. To bring this into consciousness is in my opinion one of the important aims of medical education. After having had a short look at your program, I am sure that this meeting will contribute to that.

In keeping with this, I wish you a very fruitful conference and a pleasant stay in Münster.

SESSION I:

SCIENTIFIC THINKING IN MEDICAL EDUCATION
- GENERAL ASPECTS -

Chairmen: Prof. D. Taner (Turkey): Prof. W. Tysarowski (Poland)

Concept and Relevance for the Physicians's Practice

Prof. Dr. med. Richard Toellner
Institut für Theorie und Geschichte der Medizin
der Universität Münster, FRG

Summary

The physician's practice is the marrow, the quintessence of medicine. Medical practice is to act in particular cases, is the interaction between the physician and an individual person, who asks the physician for advice or help. Finally all systems of medical research, science and technic, all social efforts of medical education, health-organization and health-insurance are aimed at the physician's capability to act in an individual case. On that account the physician needs medical thinking, medical knowledge, medical activity, medical behaviour, medical attitude. The capability to use all these in the individual case is the medical art.

For two thousand years medicine was taught and learned as an art. But for more than a hundred years medicine has been taught and learned as a science. The old medical art has been superseded, omitted and forgotten. The result: scientific thinking is wasting medical thinking. E.g.: for the scientist the patient is an object, inevitably an object of examination, of inquiry, of investigation, an object of treatment, a participant in experiments. For the physician the patient is a subject, an individual, a person with his history in his social context, he has personality with human rights.

Medical education has to contain scientific thinking within the area of science, has to train the psychomotoric abilities, has to educate a medical attitude, has to bring up a moral sense for the relation to the patient. A new concept of Medical Education has to consider that scientific knowledge is only one of the three pillars which bear the medical art. The others are: exercise in medical action (diagnostic-therapeutic process) and medical ethics.

My subject is "Concept and relevance for the physician's practice". I am afraid that I shall frustrate your expectations, because I brush my theme the wrong way. I want to speak about "The art of Medicine" or medical art and therefore of medical thinking as opposed to scientific thinking.

A certain joke among students of medicine, quite advanced in years and therefore circulating in many variations, says in its simplest form: An internal specialist knows everything and is not capable of doing anything, a surgeon does everything and knows nothing, a practitioner is not capable of doing anything and does not know anything: therefore he is a good doctor, just that is the trick, the art. The youthful sarcasm of this joke tells more about our topic "medical art" according to its conception and its reality than I would be able to comment upon in many hours.

No doubt. Modern medicine is science. But there is no criterion that allows us to define medicine as a unity. Medicine is an omniumgatherum of sciences: from mathematic and physics to biology and psychology to social sciences and humanities like philosophy. No systematical, no historical, no methodical criterion is able to unify medicine to one science. Only the purpose of medicine, its telos, establishes the unity of medicine: what serves its purpose belongs to the medical sciences. Therefore the aim and the purpose of medicine also decide the concept and relevance of scientific thinking in medicine. Medical education has to consider that fundamental fact, but medical education is far away to do so. Let me explain that systematically and historically.

The action, the behaviour, the conduct of the physician in his/her relations with the patient, is the centre of medicine: medical practice is its task and duty. The physician's practice is the marrow, the quintessence of medicine. Medical practice is to act in praticular cases, is the interaction between the physician and an individual person who asks the physician for advice or help. Finally all systems of medical research, science and technic, all social efforts of medical education, health-organization and health-insurance are aimed at the physician's capability to act in an individual case. On that account the physician needs medical thinking, medical knowledge, medical activity, medical behaviour, medical attitude. The capability to use all these in the individual case is the medical art.

"De singularibus non est scientia" Aristotle said and it holds true today. The physician is not concerned with generality but with singularity. Medical practice does not consist in applying science but in pursuing the medical art. The physician has to include the particular case in the universal rules. During the long diagnostic-therapeutic process he/she has to make the right decisions, find correct information on the condition of the patient and take the right consequences in the individual case.

In principle, he/she must do it with incomplete information, mostly within a short time, always under compulsion to decide. The function of the medical art is to enable him/her to do so. The methodology of medical proceeding is neglected by medical sciences, it is a domain of the medical art. That teachable and learnable art is grounded in knowledge and experience, in skill in medical proceeding and handling and in the moral law of the medical profession. It needs instruction, training and education to become a master of the medical art.

The present doctors in medicine show us the strange two-sided face of a modern Janus. Even through they have a purely scientific education, they live during practice from the medical art, although it has been pushed into the background and has been neglected. As a result, physicians find themselves in a remarkable crisis of identity. Now and in the near future the doctors' workday routine is based on medical art as much as the application of science may influence their medical actions.

Among the older European generation of doctors the art of medicine, however, is still existent. Friedrich Curtius begins his book "About medical thoughts and opinions", which appeared in 1968, with the chapter: "is medicine art or science?" His answer, however, is significantly contradictory. On the one hand he says that the alternative is wrong, medicine is both art and science because the doctor needs "knowledge of nature, knowledge of the human being and skill". On the other hand he claims: "Medicine is an experimental science" which "must submit itself to the same rules of thinking" as every other "science solely serving cognition".

By that point I enter the field of history. In whatever way one tries to define medical art, the difficulty remains to relate medical art and science to each other. This difficulty apparently emerges only when this relation is searched for as being possible, meaningful and necessary. The historian asks by rights when and where this relation arose and when it became a problem and - as far as it is possible to ask - for what reasons. Is it a change in the conception of medical art or a change in the conception of science which makes a definition of the relation possible or necessary? The establishment of a professional practice of medicine is one of the most outstanding achievements of classical antiquity.

In Corpus Hippocraticum medicine is established primarily and paradigmatically for all arts as techne iatrike, as ars medica. Art is the well-planned creating of a thing or an effect, a practice which differs from the common way of living, whose most important characteristics are mentioned in the writing "de arte". Within a certain field of activity limited by natural possibilities, competence, experience (transmitted or own experience), regularity, the capability of learning and teaching, practice, purposiveness and effectiveness (meaning the success which excludes Tyche, chance and fate) are the characteristics of art. Art cannot be known, it can only be practised and therefore only be learned by practice in the imitatio magistri, by imitating the master.

The authoritative relationship between teacher and student, the personal structure is constitutive for art. This conception of art covered in Antiquity and in the Middle Ages not only that completely, which one knew, thought and did in medicine but at the same time integrated medical thinking, knowledge, practice to an inseparable unit. The definition against antique-medieval

conception of science therefore presented no serious difficulties, not only to Aristotelian tradition. Medicine was not a system of common, abstract truths, not science but as an art it was an action directed towards the single, special and crucial case.

It is the goal-oriented practice aimed at healing in a highly complicated, conditionally determined situation. Forced by the necessity of acting and the pressure of time, doctors must always make decisions even if they possess only fundamentally inadequate information. The situation in which they act cannot be theoretically deduced. It is never completely clear nor can it be completely reproduced at a later time. Therefore the doctors' actions can only be legitimized and defended by empirical success. The medical knowledge and rules of medical practice which govern the art of medicine developed from the sum of medical experience, individual as well as collective, diachronic as well as synchronic. Because medical knowledge is a balance sheet of positive and negative experience, individual negative experiences must be expected.

In exceptional cases of medical practice for which neither clear-cut analyses of the situation nor definitive prescriptions for treatment exist, failure is more readily attributed to the practitioner than to the perceptual system applied, i. e., the art of medicine. The practicing doctor is blamed for having made a mistake or for having acted irresponsibly, even accused of being a deceiver or criminal. The uncertainty of the art of medicine is evident in failure. Every medical act shows itself as an "experiment" in the true sense of the word, a trial insofar as its result is uncertain and only predictable within the boundaries of certain probability. In a malpratice suit, the disappointed and offended patient necessarily meets a doctor who is supported by a phalanx of colleagues who are prepared to describe and explain the principal uncertainty of the art and to demonstrate to what extent the boundaries of scientifically and ethically defensible medical practice are open-ended. The doctor's act can only be judged according to whether he/she has proceeded "lege artis" or not. This uncertainty inherent in the practice of the medical art led doctors to develop a theory of duties and behaviour whose goal is to win and maintain the confidence of the patient. Only if the patient has good reasons and a basis for his faith that a doctor would never willingly act against his interests does failure lose its consequences for the doctor. The confidence of the patient was founded on the ethical dependability of the medical art, not on the dependability of the practicioner's knowledge. Innumerable victims of medical healing attempts which were completed lege artis et bona fide have, however, never principally shaken the trust in doctors and their art.

Considering these victims of the medical art, it is not surprising that in the middle of the 19th century, the demand to systematize medicine became greater and the rejection of medical experiments in therapy became more determined. Josef Dietl (1804-1870) formulated the beliefs of socalled "therapeutic nihilism" most consistently: "Medicine regarded as science, cannot attempt to concoct life elixirs, to establish magic cures, or to ban death; rather it must investigate the conditions under which man becomes ill, recuperates or dies; in other words, science must develop a natural theory based on chemistry and physics and therefore scientifically founded. Because the old school concerned itself with healing rather than research, the new school must do research in order to heal... Our strength lies in knowledge not in practice." Dietl wanted to replace the empirically tested and legitimized curative practice by scientific knowledge. The clinican of Munich von Ziemssen said: "The old medical art is fallen, modern times are coming. Medicine has to be a science, not art." The use of scientific thought and the employment of scientific experiments in order to gain certain knowledge which had long been common in the basic medical disciplines like anatomy and physiology now first appears in clinical medicine. The doctor-patient relationship necessarily changes. Now, in order to acquire secure scientific knowledge, effective therapy for the individual patient was relegated to second place, in the deceptive hope that accurate, dependable knowledge would empower the physician eventually to attain a more dependable therapy. Given this goal, the advocates of scientific medicine necessarily viewed the patient as an object of observation, investigation and experimentation. Patients, special and unique individuals, became "study material" which was categorized and organized according to type of illness and which could be used to test the validity of hypotheses and theories.

This research resulted in a great deal of new knowledge, while the practical aspects of curing were still bound to the old healing arts. Experimentation helped develop a method creating intersubjective, demonstrable and

generally applicable knowledge. Even today, however, the general knowledge attained scientifically is not strictly applicable to each individual case. Then as now one has to trust the rules of the art which are based on experience. In this way the coexistence of practical experience and science is established. To heal is an uncertain art, a unique and individual act whose risk is justified only by the ethics of the doctor. Experiments on the other hand belong to medical science, and the individual patient is then seen only collectively, and thereby becomes an "object" or "thing", not insured by anyone against the risk of suffering damage to the body and soul.

For two thousand years medicine was taught and learned as an art. But for more than a hundred years medicine has been taught and learned as a science. The old medical art has been superseded, omitted and forgotten. The study of medicine has become a scientific one, scientific knowledge and scientific thinking have been brought into prominence, the training of the methodology of medical practice has disappeared and little care is bestowed on medical ethics. The desire for more practice in medical education which has meanwhile been expressed for over a hundred years is nothing else than the desire for the lost medical art, although it is seldom pronounced expressis verbis against science. The result: scientific thinking is wasting medical thinking. I repeat, for the scientist the patient is an object, inevitably an object of examination, of inquiry, of investigation, an object of treatment, a participant in experiments. For the physician the patient is a subject, an individual, a person with a history in a social context, who has personality with human rights.

Medical education has to contain scientific thinking within the area of science, has to train the psychomotoric abilities, has to educate a medical attitude, has to bring up a moral sense for the relation to the patient. Science produces scientific knowledge, no less, no more: true knowledge by the standards of the current state of science. The most reliable, the most certain knowledge the physician has. But by the probabilistic character of all assertions in biology and medicine and by the practice in an individual case the doctor is obliged to follow the medical art. Scientific thinking is one of the conditions, is a qualification of medical thinking, but never a sufficient qualification of practice. A new concept of Medical Education has to consider that scientific knowledge is only one of the three pillars which bear the medical art. The others are: exercise in medical action (methodology of the diagnostic-therapeutic process) and medical ethics.

The loss of the medical ideal of the ars medica is a subject which has not received sufficient thematic attention. I feel thoroughly convinced that this topic is the most relevant for the future of medical education.

Since science stands as a guarantee for correctness and certainty there is the dislike of practicians to be reminded of the fact that they arenot practising a science but an art. What we lack still today is the ever renewed reflection upon what the art of curing, the art of medicine, is, what it avails and is able to do, where its limits are, and how it is practised properly. It is unimportant whether I practise it as the incarnation of medical action or only as an unavoidable makeshift. It deserves attention as a practice, it deserves to become an object of a science which it is part of, object of clinical medicine.

TEACHING THINKING IN MEDICINE

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Introduction

Teachers like to believe that they teach their students to think. However it is not clear that thinking-ability is often measured. There are various meanings for 'thinking'. Some people equate it with the application of logic, philosophy or mathematics. Formalisms or disciplines like these take three or more years to learn, and are concerned with ideal or absolute entities and relationships which are rare in the everyday world. Thinking, however, goes on continuously in our minds, whether or not we have learned formalisms. This thinking seems to be associative, a process of finding and relating two appropriate elements in memory and assessing the relationship for its truth, usefulness, or ability to facilitate perception of further relationships. These operations are carried out on notions in memory. It thus can be difficult to separate thinking from knowing. The emphasis in teaching however may favour one or the other. One can 'teach' by requiring rote memorisation. One can also address the other extreme, and emphasise the process of thinking, without stressing the assimilation of the stimulus material.

The operations of thinking would seem to be much the same no matter what the material to which they are applied. Scientific thinking may be that in which the elements, the relationship and the testing are quantitated. In this regard, it can be difficult for medical thinking to be scientific. Few clinical presentations of disease are objectively defined or quantitated (Burbank, 1969; Staniland et al, 1972; O Beirn et al 1987). Further, much of the output of technology generates images or traces for sensory perception, and which are not quantifiable. An antecedent for scientific medical thinking is quantitation of medical data. In the meantime, ordinary associative thinking must go on. It is this that guides the professional in the delivery of his knowledge. Perhaps, then, it deserves cultivation no less than does memorising data. There is however a difficulty, in that no two people share identical experience or its associations. There are thus certain conditions to be met if associative thinking is to be cultivated.

Requirements

1. To evoke thinking processes, the stimulus must be something the student has not already formally studied, otherwise one gets recall.
2. To make the thinking discernible, the stimulus must be simple and self-contained: that is, it must not require extensive external associations or subclasses to be evoked in order to deal with it.
3. To ensure that attention is paid to the process of thinking, rather than to the content, the content must be of little import to the student.
4. To provide feedback the exercise must have some quantifiable output and reference standard.

The above points are in contrast to those of memorisable content, which is usually discernible, quantifiable, important for examinations or real life, and constitutes its own reference standard. However, if thinking is an examination of experience to control the present or anticipate the future, then in this process there are skills - to select the appropriate exploratory behaviours, to carry them out with least effort and to do so completely. It is clear that there must be a best way, or ways, of doing so. To teach thinking, these ways are to be demonstrated, sought, and rewarded.

The need

There is a need to foster cognition in medical students.

1. They are asked to learn too much. The undergraduate course encompasses some 140,000 facts and principles (Anderson and Graham, 1980) or up to 24 new facts per hour of their course.
2. The problem can become more acute on graduation. The facts/principles of internal medicine are estimated to exceed a million (Pauker et al, 1976). Clinical experience helps sort and integrate the knowledge. But clinical experience can be highly personal, and the resulting judgement is guided by personal thinking (Grant and Marsden, 1987).
3. Furthermore, under present training methods, the cognitive performance of doctors is suboptimal. It has long been known that even senior specialist clinicians agree altogether on as little as a third of case findings (Fletcher, 1952).

Observer error can exceed 20% in all aspects of medicine (Koran, 1976). Much of it may arise from lapses in cognition or motivation, rather than in knowledge (McDonald, 1976).
On the whole, it seems advisable that medical students should receive guidance and training in thinking as well as in the factual matter, concepts and interpretation mechanisms specific to medical data. There is a growing literature on teaching thinking (deBono, 1971; Maxwell, 1983; Nickerson et al., 1985). As memory and calculation can be delegated more and more to computers, cognition, rather than information, becomes the limiting resource in human endeavour.

Curricular time

A suitable placing for such guidance may be during the first clinical year, integrated with the developing clinical knowledge. There the thinking that is generic can be taught uniformly in a scientific atmosphere in the same way that the disease processes that are common to all specialties are taught in the course on pathology. We have been exploring this approach in a course on objective methods that occupies 160 hours in the first clinical year (Lavelle, 1989). It shares the same university examination as Pathology. The teaching method is to give the students a task that exercises the particular skill, and to feed their performance back to them together with that of their peers. The class composite is used as a standard. The results are discussed. The procedure is repeated six or so times and the progress of the class is mapped. Students become aware of their own performance, of that of the best in the class, and of the class mean.

The module of thinking occupies some 8 hours, or some 0.15% of the undergraduate course time. It evolved from one on problem-solving. This was not problem-solving of the case-elucidation type, which is really no more than the process of diagnosis. It was problem-solving in the sense of finding a way out of a difficulty into which one had fallen. A development of that thinking can be regarded as the creation and exploitation of opportunities prospectively. The elements addressed are observation, interpretation of data, the inter-relating, generation and assessment of ideas, and relationships of cause, consequence and purpose. The patient is too complex a stimulus for these exercises, even it it were possible to get the whole class around one bed. The stimulus used must be simple if it is to promote concentration on the process.

Rationale

Why should we believe that we can improve students' skill in thinking, an unquantitated, multifactorial, stimulus-oriented, unobservable process? Firstly, any training that provides awareness, a vocabulary, experience and pursuit of performance allows people to improve skill. Secondly, observation is a process similar to thinking (which is, after all, internal observation) and observation seems to be improved by training (Fig. 1). Thirdly, there is some evidence that thinking improves if persisted with (Crowell, 1982; Edwards and Baldauf, 1982).

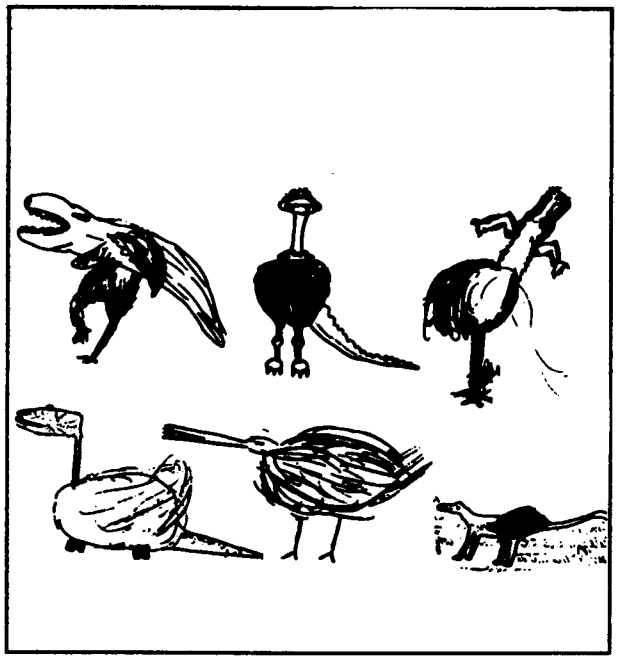

Fig. 1. Illustrative responses to the task 'draw a cross between an alligator and an ostrich'. Although some 14-20 items (teeth, tail, toes etc.) are involved, no two drawings are alike, illustrating the variability in the selection of associations from experiential memory.

Nonetheless it seems wiser to follow an experiential approach than a theoretical one. So we look to see what the mind does when faced with a task, then we classify and quantitate the responses, and finally attempt to focus on 'specific' operations. This is, of course, a bit artificial, since the processes are integrated and interdependent, but we could find no better way. With 65 students in a class, the performance of the group should be fairly representative. The exercises are tentative: better ones will emerge with time. The students are asked not to try to

replace their own cognitive methods, but to look at and think about what happens and take up anything that improves their performance. However they are expected to be able to carry out the exercises.

Method

Observation and overload: Observation is dealt with in a separate module. Students observe simple objects. Sensory overload is demonstrated by dictating numerals (0-9), or letters, or monosyllables, at one second intervals in sequences of increasing length and getting the students to write them down immediately afterwards. They remember on average 7 figures, 6 letters and 5 monosyllables, with some variation. This limit of 6-7 appears repeatedly in the cognitive performance of untrained subjects.

Idea structure: Next the structure of ideas is addressed. A simple object is shown and they write down what comes into their heads. We use non-compound objects of everyday experience that have not been formally studied, such as a toy balloon. Aside from the observable characteristics and functions of the object, its 'idea' contains associations of space (where it is found; what things are found with it); likeness (things like it; subclasses); time (origins and causes; fate and consequences), relationship to observer (feelings aroused) and value (rules for use of). For a given object, some of these may be trite. But incorporation of these elements into an experiential memory tree may help to make it more systematic and thus searchable. It is interesting that in such a goal-less search of memory, the average number of the areas accessed by untrained subjects is always less than half. The students are given exercises in drawing products from each area of association. Some find it difficult, but it does provide a general map for a comprehensive sweep over the common sectors of memory.

Relations: All thinking, not least creativity, appears to be reducible to relating two ideas. Relationships between ideas may be explored by writing down what comes to mind when shown two objects together. The products exhibit much the same categories as do single objects. The names of objects appear to serve just as well as their physical presence. The process would seem to be fundamental in looking for a novel connection between two ideas. It may deserve expansion. Some students find if difficult. Perhaps the advantage to them is to have gone through it and set a behavioural precedent.

Interpretation: The steps in interpretation are shown by asking the class to make the best sense they can out of a scrambled sentence. The way the elements are put into segments that are familiar, and the way the segments are rearranged into a whole that corresponds to experience or to possible experience, are made manifest. Most students decipher the sentence correctly. Some make an incomplete synthesis and an element is left unaccommodated. Others produce a construction which requires them to add an extra word in order to make sense. Both mechanisms occur in the development of explanation in science. In the same way, when they are asked to observe a novel event (a fluid 'spontaneously' changing colour), many produce 'explanations' which demonstrate the stages in the emergence of 'hypothesis' or provisional interpretation of the component events (deBono, 1971).

Idea generation: The dependance of creativity on knowledge is illustrated by asking the students to draw a novelty, such as a cross between an alligator and an ostrich. Although no two drawings are the same (Fig. 2), they are assemblies of the same dozen-odd features taken from either animal: teeth, head, forelimbs and so on. They can be assessed by counting the number of elements included in the drawing. They represent the easiest case, as there is a one-to-one correspondence between the stimuli.

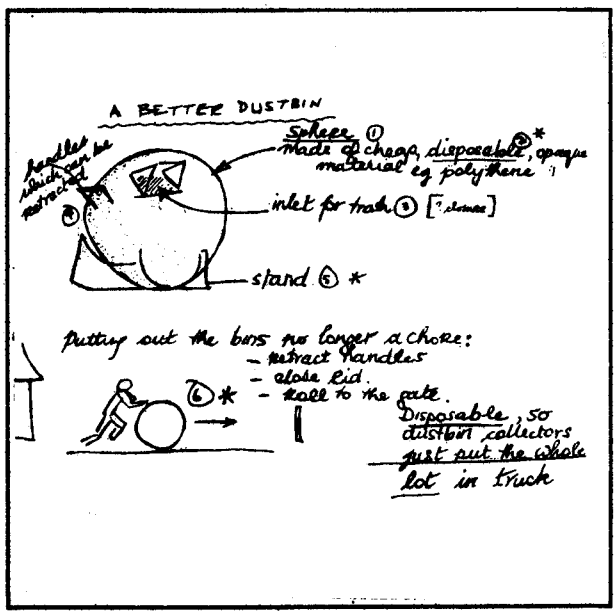

Fig 2. A response to the task 'draw a better dust-bin'.

The next task has less structure: it is to 'draw a better...' design of any commonplace functional object, labelling the elements. The drawing has the advantage that it 'permanentises' the thinking onto paper, allows update, and focusses attention on elements which have not been thought through (deBono, 1969). The exercise can be marked by counting the elements, with extra marks for implementable novelty. It is however in part dependent on the individual's experience of the stimulus, and successive exercises are not highly comparable. Some students prove highly creative and set track records to be emulated (Fig. 3). A few have difficulty in accessing any new element to include in their design. If the ability is a necessary one in medicine, (and general practice often calls for creative use of resources) then they badly need practice in it.

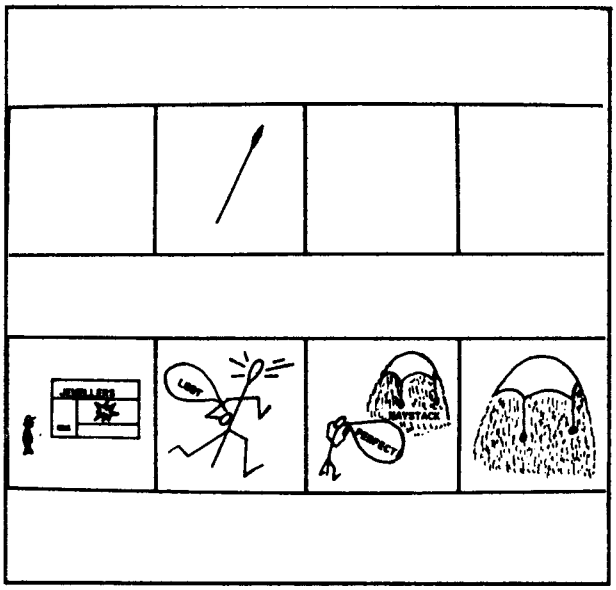

Fig. 3. A response (lower frame) to the task 'complete the cartoon', the stimulus being a needle drawn in the second panel (upper frame).

A dynamic aspect is provided by sequence-completion. A four-panel cartoon is given with a stimulus (flower, ladder) in one panel. The task is to complete the cartoon as a logical story. A stimulus in the first panel requires consequential thinking, one in the second or third panel event-reaction thinking (Fig. 4), one in the last panel causal thinking and one in the first and last, means-end thinking (Spivack et al, 1976). These can be marked from 1 for a prosaic completion to 4 for a highly imaginative one. When a sample of the cartoons are displayed for the students to assess, the mean mark they award correlates well with that awarded by the instructor.

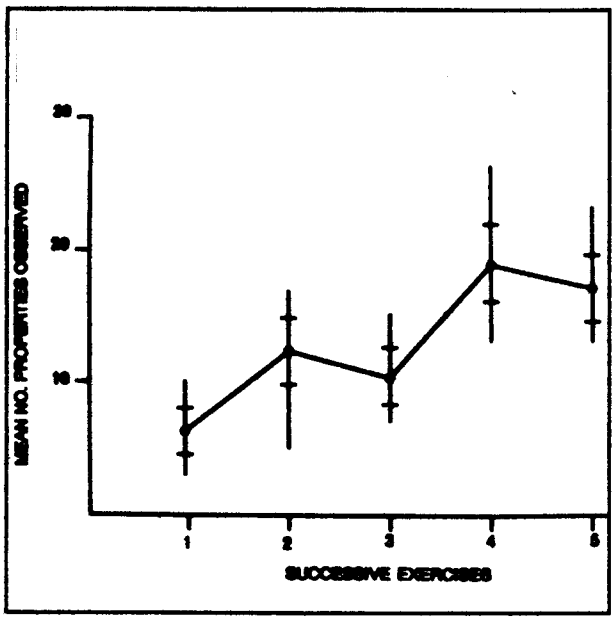

Fig. 4. Mean class scores in exercises observing successively a rubberised mat, aluminium bar, perforated metal sheet, bathroom sponge, pane of glass and toy balloon.

Assessment: One must, when memory or sensation fail, have recourse to thought. It is vicarious experience. If one had perfect information there would be little need to think. In many ways thought is a reaction to novelty, external or internal. A novel idea, or any idea for that matter, will benefit from assessment under eight headings:

A. What are its immediate advantages?
B. Can they be bettered by adding something to the novelty?
C. If it is not of advantage now, are there 'catchy' or memorable points that may be of use in the future?
D. What drawbacks has it?
E. Are there other objects or situations whith would benefit from extension of this novel element to them?
F. Are there further or alternative ways of achieving the same end with less drawbacks?
G. What other novelties in general come to mind as this one is explored?
Q. What questions does the novelty provoke?

The process of assessment leads inevitably into idea generation. B, E and F (above) invoke creativity directly, while C stores away raw material for future originality. A, D and Q are stimuli to innovative acts. Assessment is a springboard to creativity. The process can be exercised on simple novelties that do not distract attention from it, such as a shoe with the heel in

front (useful for walking downhill) or with a side zipper instead of shoe-laces (Table 1).

Table 1. Some class responses to the task 'assess the novelty' of a zip fastener in the side of a shoe, to replace the lacing in front.

ADVANTAGES
NO LACES TO BREAK * NO LACE TO TRIP ON * SAVES TIME IN LACING * NO TRAILING WET LACE * DONT NEED TO BE ABLE TO TIE KNOT * GOOD FOR CHILD AND OLD * SAVES BENDING * MORE WATERPROOF * EASIER TO POLISH * COVERS ODD SOCKS

BUILD-ONS
ZIP ALL THE WAY ROUND AND REMOVE HEEL * PUT ZIP AT BACK * ZIP ALSO AT OTHER SIDE * CLIPS ALSO IN CASE ZIP BURSTS * SERIES OF ZIPS TO ALLOW WIDE OPENING * RING PULL ON ZIP * PAD UNDER ZIP * FLAP OVER ZIP * DOUBLE ZIP TO AERATE SHOE

CATCHY
NO FRONT OPENING * ZIP INSIDE OR OUTSIDE ANKLE * SHOE LACES REDUNDANT * MAN'S RATHER THAN WOMAN'S * ZIP REPLACES LACES * ZIP UP AND KEEP DRY * ZIP IN A SHOE * SHOE WITH NO LACE

DISADVANTAGES
MAY NOT FIT ALL FEET * NO RELIEF FOR SWOLLEN FEET * ZIP MAY CATCH IN SOCK * ZIP MAY BURST UNDER STRAIN * ZIP DIFFICULT TO REPLACE * ZIP MAY GET STUCK * ZIPS RUST * LESS VENTILATION * WATER LEAKS THROUGH ZIP * MUST REACH TO GROUND TO DO UP

EXTENSION
ZIP SAIL TO MAST * ZIP CURTAINS TOGETHER * ZIP UNDERPANTS * ZIP SURGICAL GOWNS * ZIP HAT * DOORS OF PRESSES ZIP SHUT * ZIP DOORS FOR CARS * ABDOMINAL SURGERY - LATERAL INCISION AS NORM * BUS DOOR AT BACK * ZIPS INSTEAD OF BUTTONS FOR ARTHRITICS * BUILT ON GLOVES OR RAINCOATS

ALTERNATIVE MEANS
GO BAREFOOT. - NO FASTENINGS * ZIP UP THE FRONT * VELCRO. PUT A DRAWSTRING AROUND THE TOP * USE PRESS-STUDS INSTEAD.

QUESTIONS
WHAT KIND OF ZIP WOULD STAND THE STRAIN?
A WATERPROOF ZIP? HOW WOULD THE SHOE STAY ON?

These are of course trivial stimuli. Usually they are inferior alternatives to the conventional. They are used because they are virtually knowledge-independent (everyone has prolonged experience of shoes) and they call attention to the thinking process applied and make it manifest. The basic operations of thinking (same as, greater than) are themselves trivial, like those of the computer. What gives them their power is doing them rigorously and completely in optimum succession. A doctor has the same cognitive ability to apply to trivial as to complex stimuli. It should surely cope better with simple than with complex tasks. The stimuli seem to be adequate, since the students cannot all perform to top level in the exercises. In any case there has to be a beginning, and beginnings are generally weak. Better objectives, better exercises and better assessment procedures will emerge with time. Some students at the outset tend to be critical, even dismissive or scornful. But even after several exercises many have difficulty with items C, E and F. It is hard to say whether it arises from the nature of the objects, or from the students' training to date. Perhaps a memorisation training may lead to a critical outlook instead of an appreciative one. At any rate, they do not find the operations trivial to perform.

Examination

The module is assessed by setting examples of the exercises in the examinatin paper and marking as before. It lends itself well to the OSCE format (Lavelle and Harden, 1987). Performance falls a little at the examination. The improvement on thinking exercises is less than that seen in other exercises such as observation or diagnosis. Habits of thinking may be more strongly ingrained, or the exercises less efficacious. This aspect deserves research.

Discussion

It is very important in such training to use a persuasive, non-coercive approach, and a light-hearted style to avoid the exercises becoming a drudgery. The students enjoy and appreciate the module. They consistently rate it the best-liked in their end-of-year assessment of the course. Many find it a heartening change, and claim that they have attained a valuable aid to their thinking. However, a number of obvious questions arise.

1. Can one really develop thinking by teaching?

Some evidence suggests that one can (Crowell 1982; Edwards and Baldauf, 1982). Other aspects of clinical skills improve with study (Gill et al, 1973). Students produce what is demonstrated, sought and rewarded. A teacher may not seek or reward thinking but he cannot avoid demonstrating it - good or bad. Similarly, texts provide a reasoning model even when presenting knowledge. Formal tuition only serves to broaden and strengthen these. Evaluation of the validity of the thinking output may need to be added (McPeck, 1982), but this seems to be automatic in our students.

2. How much do teachers try to develop thinking?

Demonstration, seeking and reward of thinking should perhaps appear frequently in a teacher's interaction with the class. Other things can be addressed instead, such as recall, exercise-of technique, discipline, or even dysfunctional behaviour, as sarcasm or condemnation. Their relative frequencies indicate the degree to which the teacher promotes each. I was able to obtain a few tape-recordings of secondary school teachers conducting classes. Formal demonstration, seeking and rewarding of thinking were rare behaviours. The same may be true of much medical school teaching. The effect of teachers' body-language and expectation were not assessed.

3. How effective are these exercises in promoting thinking?

Thinking about performance can improve it (Jansson, 1982). The exercises are an adjunct to, not a substitute for, traditional medical thought. They are probably no more effective than are the exercises in other courses. How much pharmacology, pathology, haematology is retained six months after the course is completed? But we do not question the efficacy of subjecting the students to them. Some material is retained. Some will crop up continuously in clinical experience. The remainder is familiar to the students and they know where and how to find what they want. The need to think arises fairly often. The students probably continue to employ any technique they find to be of use. Students returning to a 'memorisation-oriented' environment may retain little.

4. Does a general course in thinking improve medical thinking?

This is the significant question. At present we do not know. Nor is it easy to design and organise a proving ground. What is meant by medical thinking? Professionals will reduce as much as possible their stock-in-trade of knowledge to 'rules of thumb' (formulae), which they apply in routine cases. Such 'medical thinking' the student gets in the wards and texts. Doctors feel confident about typical cases (O Beirn et al, 1987). However, roughly one third of cases are atypical (Sterne et al., 1973). Rules of thumb may not suffice for these. The doctors then have to find and put together disparate data from their stored knowledge, to 'think'. They may be more effective in doing so if they have studied the process experientially and are aware of their personal tendencies to deficiency, as in the case of golfers seeking to improve their swing.

5. Should a course in thinking be introduced to the curriculum?

The traditional orientation is to get on with presenting the facts and their immediate import, test them at the examination, and leave the use of them to the cognition of the individual. Should that continue? In the information age, with an observer error rate in medicine exceeding 20%, the public may be less than satisfied Moreover, when there is a problem, and the consequences are deleterious to patients (Adams et al, 1986), there is perhaps a

Hippocratic obligation upon us to institute remedial action. Students seem to appreciate it. It may be that they are entitled to a formal development of their ability to think. Perhaps funding should be released to explore how that may be best done.

Thought-worthy clinical data

Current textbook descriptions of diseases, treatments, and outcomes are often imprecise and unquantitive, using descriptors such as 'common, ususal, rarely', whose interpretation by the individual shows a profound variation (Bryant and Norman, 1980; Toogood, 1980). Scientists use the same associative thinking as other people: but on precise and quantitative data and procedures. For the development of scientific thinking in medicine, it is necessary to provide defined, numericised data to work with. In this regard, there is an interesting initiative of the European Community to realise a test-set of such data.

European initiative on scientific clinical data

The beginning of good thinking lies in accurate and relevant observations. Clinical data is biologically determined. It is likely to be the same from one country to another. It does not change with changing technology. It thus is likely to be a standard to which all subsequent health data can be referred. The EC has set up an initiative to gather accurate and significant biological observations for the diagnosis of two disease presentations (Lavelle, Beneken and Dawids, 1990). One is on jaundice, a mixed medical-surgical, acute-chronic and technologyêconsuming-illness. The other is on acute abdominal pain, an acute surgical condition with low use of technology. An internationally-agreed diagnostic data set is being gathered on a large number of cases of both conditions in some 100 hospitals throughout the EC during the 2 years up to early 1991. The resulting database will be analysed with a variety of statistical and reasoning techniques. It should provide an accurate, quantitated, clinical description of each disease involved.

In the second phase of the trial, in 1991, a diagnostic-aid computer program founded on the database will be tested in many other hospitals. Information can be obtained from the project leaders*. The database will be made available to the centres which participate. If the effort is successful, similar documentation of other presenting symptoms may well follow rapidly. There will be adequate quantitated and significant material for true scientific medical thinking. It may be our task to ensure we have thinking-trained young doctors coming through to utilise it.

* Project-leaders: jaundice: Dr. P. Keeling, Euricterus, University College, Galway, Eire; acute abdominal pain: Dr. FT de Dombal, Clinical information Science Unit, University of Leeds, United Kingdom.

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Scientific thinking: Its Relevance to the Quality of Care

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The quality of care depends heavily on the knowledge, skills and attitudes of those who make health-care decisions and those who carry them out. This applies whether these decisions are made on behalf of an individual patient or at the aggregate level.

Medical education therefore, plays a critical role in developing the quality of care.

Both medical education and, increasingly, the education of nurses take place in an university or a university-like setting. During the educational years, the student will be taught factual knowledge, practical skills and the moral dimension of attitudes.

In universities the ambition also is to introduce students to "scientific thinking", which is both "know-how" and an attitude. It deals with methods, used to purify knowledge through the testing of hypotheses, and with moral attitudes to that body of knowledge which is called science.

Science and scientific thinking are concerned with the development of new knowledge which has general validity and is generally accepted. Scientists test their hypotheses by asking the question: true or false.

As health professionals in their daily work do not focus on the development of new general knowledge, they do not ask the question: true or false. Their work is mainly concerned with action and policies geared to good health care, so they ask the question: "What ought to be done?" This "ought" is not a scientific question. They also ask: "What ought to be done for this patient or this community?" This question is not general a one, but an individualized one. Nevertheless the answer to this "ought"-question may be based on scientific knowledge, and therefore the "ought" may be a technical "ought" and not a moral one.

Mostly, however, science does not offer clear-cut answers to the question of what ought to be done; the professional is faced with choices, uncertainty and value judgements and the "ought" becomes a moral one. It is this switch from the technical "ought" to the judgemental "ought" which forms the borderline between scientific medicine and the art of medicine, and it is here that the problems arise in both medical education and the practice of medicine.

At this point, it may be useful to define what I mean by the word science. To many physicians science is defined by the "scientific" method. Science is a body of knowledge arrived at by means of a specific method which guarantees a high degree of reliability (truth). And scientific method is defined by the production of science. This definition comes dangerously close to a circular reasoning. Scientific method has been discussed over the years from Bacon, Hobbes and Hume to Popper, who proposed the falsification approach, and Feyerabend, who stated that any method may be used in science.

I should like to use Kuhn's approach, where the emphasis is on social qualities. Science is a body of knowledge which is a product of collective human enterprise, to which scientists make individual contributions that are purified and extended by mutual criticism and intellectual collaboration. In other words, science is a body of knowledge, generated within a particular framework of thinking and generally agreed upon. Mathematics, physics, chemistry and biological sciences such as physiology, biochemistry and anatomy fulfil the demands of an unambiguous language and a great deal of consensus. This is, however, not true for the behavioural and social sciences and humanities, which have such an enormous influence on health care. Clearly, ethics and medico-legal matters fall outside this definition of science. But also psychology and sociology become difficult to characterize as science because their concepts are sometimes imprecise and ambiguous. At times there is a lack of experimental reproductability, and there is doubt about some of their constructs. And particularly, consensus is not always present.

Furthermore, sociology and behavioural psychology are concerned with models. Doctors and nurses are mostly concerned with individuals. Administrators and politicians working with aggregates may be more interested in these models, but very few of them realize that the activities of formulating models and studying their implications are much more of a conceptual exploration. Very often people tend to regard these activities as falling within the

framework of biological science. The models are regarded as empirical hypotheses and tried in the traditional scientific frame of reference of true or false, verification or falsification.

If this line of thinking is accepted, then we must consider health care and the practice of medicine as not a scientific endeavour but a humanistic one, which sometimes makes use of scientific tools to establish the necessary body of knowledge for decision-making. Then, of course, the term "health science" as at present used loses its sense as a description of the activities and instead simply becomes a name of some transsectoral activities related to the establishment of good health care practices.

Still, science is obviously one prerequisite for good care, but even if science is an essential ingredient in medicine, it does not automatically follow that scientific method is an essential ingredient in the daily work of medicine nor that scientific thinking is that specific state of mind which gives quality to daily clinical work.

To discuss this matter I shall turn to the consumer's perspective on health care.

Two issues related to the quality of care have been in the limelight of public debate during recent years. These are the dehumanization of medicine and the large variation in practice styles between physicians and hospitals.

The dehumanization discussion has occupied both the public, the media and the philosophers, while the variation in practice has caused worries to planners, economists and politicians.

In both cases blame has been put on the education of physicians and on the present philosophy of medicine. Those concerned with the dehumanization problem accuse modern medicine of being too biologically oriented, too scientific, and using a mechanistic, inductive approach rather than a holistic and humane one to patient problems.

Those concerned with "small area variation" underline the lack of objectivity and scientific approach to patient care and charge medical education and medical practice with ambiguity, lack of knowledge, lack of consensus, and lack of a common language.

What is the truth of these two apparently contradictory accusations against modern medicine? Do they reflect nothing other than modern academic medicine's inability to meet the needs of society?

In the book Pathologic basis of disease, S.L. Robins tells us: "In the final analysis we are all a bundle of cells cast in the form of a biped." This is just a modern version of what Descartes said: "The body is a machine, so built up and composed of nerves, muscles, veins, blood and skin, that ought there were no mind in it all, it would not cease to have the same functions."

The opponents to this view claim that man is more than just a sum of his parts, and for this reason man's illnesses cannot be dealt with in a scientific manner alone, and that scientific analysis and method alone is not the appropriate approach to health care.

While the sociological and behavioural approach to patients may be more holistic, it approaches illnesses in terms of models, that is through a set of regulative or critical standards. However, these standards are often subjective and in essence they may often be nothing but a different mechanistic approach to man and illnesses.

For the care of the sick person, therefore, something else seems to be necessary. This could be an effective ability to communicate with a fellow human being. Such ability is based on self-knowledge and self-understanding, on the capacity to imagine scenarios similar to the patient`s experiences and feelings. Communicative skills of this kind do not rely on scientific thinking but depend on personality and experience. They are taught through literature, through models and mentors.

The dehumanization of modern medicine is usually exemplified by the horrors of the intensive care unit, the futility of heroic surgery and oncological treatments - what in American medical literature is sometimes referred to as "aggressive treatment".

Also mentioned quite often is the expanded use of diagnostic procedures with the objective of classifying the patient`s illness into a preconceived mechanistic diagnosis classification that is of little or no consequence for the patient`s treatment or well-being.

Those concerned with the dehumanization of medicine postulate that narrow scientific thinking pursued beyond the borders of science is the

culprit behind the problem. They propose a re-vision of medical education so that it teaches the limitations to "scientific methods" and scientific thinking. They want to introduce into the curriculum a body of knowledge which supports communication and empathy.

Let us look at the other major point of criticism, the issue of small-area variation or practice-style variation. While those concerned with dehumanization cherish the holistic and individual approach to diagnosis and therapy which necessarily will create variation, those concerned with smalléarea variation are looking for uniformity.

For planners and economists who work in models, and politicians who work in ideologies, it is highly disturbing that people live and act as individuals, that they have different needs and wishes. Even when it comes to the way they experience themselves and their bodies, people vary. For planners and policy-makers variation creates a problem. The mechanistic view and reductionist science is the ideal, and aberrations from the norm can be dealt with only by laws, regulations, guidelines, model care programmes, protocols etc.. The study of small-area variations has revealed such heterogeneity in medical practice that it is out of question to discuss health care as a scientific undertaking, and it strongly raises the issues of education, values, and modes of decision.

In both these cases of criticism that I have mentioned, the common denominator is the use of technology. In both cases the accusation is that modern medical technology is used inadequately. And technology is applied science, the very essence of the success of modern academic scientific medicine.

Now here are two columns:

SCIENCE	- CREATION OF NEW KNOWLEDGE
APPLIED SCIENCE	- SOLUTION OF A PRACTICAL PROBLEM
TECHNOLOGY	- GENERAL SOLUTION TO COMMON PROBLEM
APPLIED TECHNOLOGY ON GROUPS OF PATIENTS	- ROUTINE APPLICATION IN HEALTH CARE
TECHNOLOGY USED ON THE INDIVIDUAL PATIENT	- CLINICAL DECISION-MAKING
ASSESSMENT OF USE	- OUTCOME EVALUATION

If we look at these two columns, which start at science, then we shall see that scientific methods take a diminishing role as we move down the column.

It is equally clear that psychology, sociology, economy and ethics play an increasing role further down the column. The underlying value in the practice of science is truth, but the underlying value in the use of technology and in clinical decision-making is utility.

If we return to Descartes and Galileo, they found that science was concerned only with primary qualities, that is things which could be weighed and measured. Secondary qualities like beauty, love, meaning, value were not included in science. They distinguished between res extensa which could be measured and divided, and res cogitans which is unmeasurable and indivisible. This distinction between mind and matter, the objective and the subjective, has followed us ever since. Health care is however distributed across both areas.

The present problem is whether it is possible to evolve a science of the secondary qualities and consciousness. Then reductionist thinking would not have to explain phenomena outside its frame of reference. Brian Goodwyn at the Open University has coined the term "science of qualities" as a complement to the quantitative science, which is the current approach, with the objective of explaining the relationship between different subjective phenomena in the same way as reductionist science does for the objective world.

If such a dualistic approach could be achieved, then science and scientific thinking would become the core issue of medical education, and the road to high quality of care.

Although the accomplishments of academic medicine and the success of biomedical science are well recognized by almost everybody, there is an increasing feeling that society's needs demand a redirection both of health care and of medical education.

The health problems today are the aging society, chronic illnesses, ego and ego-conflict problems, multiple social and behavioural risk factors, economy, demands for autonomy - not to mention hunger, unemployment and war. Some of these may not be helped by scientific thinking or a traditional scientific approach.

Moreover, while the power and emphasis today are located in institutions and hospitals, this may not be true in the future, when they may move to the homes and to primary health care. The type of social control over the quality of care might differ substantially in years to come, and the educational basis for dealing with this would need a curriculum geared to public needs and trust, with more emphasis on such subjects as the philosophy of science and medicine, the history of medicine, medical ethics, decision theory, technology assessment and quality assurance in medicine, biostatistics, health economics and epidemiology, if we want to improve the quality of care.

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Scientific Thinking in Medical Education: A Student's View

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"Scientific thinking in medical education", I believe, refers to the question of what role scientific thinking plays or ought to play as an object of medical studies.
This questions presumes that medicine is indeed a science. There being many sciences, one is faced with the initial task of defining the way in which medicine is a science.
In order to answer this question, I shall use the method of categorisation which has been in use since Aristotle, according to which a science must be defined as to

- its purpose,
- its object and
- its method.

Aristotle (1) defined a science according to whether it saw its goal or purpose in its object, it itself, or whether it was free of purpose as an effective, active or observational science. Medicine was for him an active science.
We still agree with Aristotle that medicine is an active, practical science. A physician does not practise medicine for the sake of its scientific nature, but rather in order to help the sick. The help meant here could also be defined as acting on a scientific basis. But taking action refers to a concrete situation, an individual case, in medical practice an individual person, who cannot be completely subjugated to general truths.

With that we come to the object of medical practice, ie. the things medicine deals with.
The terms illness and health will serve to define these objects, since we are interested in healing people who are ill. In most cases of somatic illness, it will suffice to limit oneself to a pragmatic course of action, for which purpose precise definitions of our terms are not necessary. This does not, however, serve to clarify the definition of medicine as a science.
I should like to limit myself to three examples culled from the voluminous discussion on the definitions of illness and health.

1) The definition of "health" issued by the WHO. According to this definition, health is a condition of bodily, psychological and social well-being. Illness is then a disturbance of this condition.
Any definition of illness will have to take into account how the patient him/herself experiences the matter. A definition such as this one can, by the same token, never suffice, since it would allow practically anyone to claim to be ill at any given time. In addition to the subjective experience of illness there are objective aspects of health and illness that are simply not covered by how one feels.

2) Grundmann (2), in an introduction to pathology often read by students of medicine, has consciously chosen a different path. He writes, "We define illness differently: it is the result of a change in biological processes that has a negative effect on the organism." In the next sentence, however, Grundmann has to rein in this statement. "Such a change is not the illness itself." At a later point he writes, "When a person is ill, the entire person is ill."
Instinctively I would tend to agree with this definition as well as with the qualification. Instinct and feelings, however, can have no more than an heuristic value in the eyes of "The Sciences". We are forced to inquire what phrases such as "the illness itself" and "the entire person" are supposed to mean.

3) Karl Jaspers (3) reveals the basic difficulty in defining the term illness in the following example. Writing on "the idea of illness in somatic medicine", Jaspers begins with the assumption that illness is a "deviation". A deviation from what? Obviously from "health", which cannot, however, be defined as some statistically average condition. Jasper continues: "If one considers this and imagines what medical thinking involves, one must come to recognise that a physician who thinks scientifically is almost never referring to an average condition when he refers to a 'deviation', but rather to an ideal definition. He does not presuppose a standard definition of health, but he is guided by a standard idea. (...)
The more one grasps of the precise interrelationships between organs, structures and functions, the more lucid this idea becomes. (...) Health is initially a term with a rather indistinct defintion and with a tone of finality similar to life, ability, etc. The deeper one's grasp of the goal oriented interrelationships in the life of the body becomes, the more one is able to proceed

from a hazy teleology to a finer one, whereby the notion of health as a standardized biological term gains in clarity, although never reaching absolute clarity."

Jasper's brief text touches upon three different approaches to a definition of health. He begins with the presupposition that the idea of health carries an ideal definition, then suggests that it works in us as a standard idea and finally comes to call it a standardized biological term that never reaches absolute clarity.

Two sources, presumably Jasper's main ones, will serve to elucidate these points.

1. Kant's treatment of the notion of an idea in his "Critique of Pure Reason" and
2. Max Weber's application of these thoughts of Kant in the field of sociology.

Kant (4) understands an idea to be a necessary term defined by reason that does not allow us to make any empirical assumptions about real objects. This means that we can talk about ideas and that under certain circumstances we must even presuppose their existence; they cannot, however, be grasped in the same way that one may comprehend an empirical object.

An example of this is the world. This is nothing but an idea. We certainly do go about understanding things within the world (which presupposes the world), but we do not understand it as a whole. The same is true of humans as a whole, and presumably of health as well; in both cases Kant would say we are dealing with ideas, not with terms and definitions.

Max Weber (5) applied Kant's perspicaciously analysed method for expanding our understanding beyond the realm of understanding one's own terms to the sciences of sociology and history. His notion of ideal types defines neither an average reality nor a concrete individual case. Any concrete historical case must deviate from the corresponding ideal type, and in so doing becomes understandable by virtue of its contingency and individuality.

All of this has little to do with the methods of natural science. We return to Jaspers.

It is quite clear to him that health is an idea in the Kantian sense and can therefore never be clearly and completly defined. For this reason, he chooses to apply the "ideal type" method developed by Max Weber to try to understand the idea of health. He does in the end maintain that medicine is a natural science, even though it requires value judgements unlike, say, physics.

The difficulty thus seems to inhere in the fact that health cannot be completely understood by applying the methods of natural science alone, and that reason still has not found a communicating link between the basic concepts of natural science and the humanities, although the two have been bridging the gap somewhat of late.
This situation does not, in any case, allow for a clear definition of the objects of medical science.
To summarize thus far, medicine is an active science without a clearly defined object.
The third characteristic of a science remains to be considered: its method.

Let us begin with a look at the catalogue of the scientific disciplines upon which medicine is based and look for differences in their method. These include: physics, biology, psychology, sociology and history.
Mathematics as a formal aid to interpretation and the orientation offered by philosophy apply to the whole field. For this reason I shall not consider these two subjects (which are indeed basic to medicine) any further in this investigation of methodical differences since they evince not a differentiating character, but rather an integrative one.

If one ignores the "problem of the observer" in physics, its scientific character, supported by the principle of causality, proves to be well established. Working from general theorems and preconditions consistent with its system, physics draws conclusions about individual instances based on the pattern of cause and effect - the chain of causality. This method allows one to make "preconditions" of events as well as to "explain" them, that is, to establish prognoses and carry out dialetical analyses according to the Hempel-Oppenheim method. The applicability of this method is generally agreed to establish proof of the truly scientific character of this science.

Causal explanations are also to be met within the field of biology. Beyond the cause-and-effect chain, however, biologists are also interested in an "ends-and-means" chain. It is assumed that the elements in a biological system fulfill an "end" that serves the entire system. In contrast to physics, this gives meaning to the purposive "why-what for?" in biology. Thus the causality

principle is replaced by the homology principle, the causality chain by the finality chain and the causal explanation by the so-called functional explanation. The Hempel-Oppenheim model remains fully in force for this method; the marriage of ends to means allows one to predict and explain an occurence within the framework of the model (6).

At this point I would like to emphasize once again the contrast with physics.

Teleological statements can only be meaningful within hierarchically structured systems such as are commonly applied in biology (7). (The fact that biological systems must also surely be subject to heterarchical organisation need not enter into this discussion.) (8) The question "why-what for?" makes no sense in the context of physics, just as it would be senseless to speak of a hierarchy of forms of energy. At the very most, one could speak of a descending hierarchy of the vehicles of energy in the sense of increasing levels of entropy. Such considerations are, however, not the concern of physicists, but, significantly, of economists, students of politics and, increasingly, biologists.

Teleology itself and statements like "the whole is greater than the sum of its parts" were for a long period distasteful to scientists. Cybernetics then rehabilitated these notions. This gave rise to the term "emergence" to define the phenomenon of it not being possible to comprehend a system's performance capability by adding together the performance capabilities of its component parts.

In psychology and sociology (from the field of medicine we can add psychosomatics, which has already made several integrative contributions) the idea of emergence is clearly in place. To illustrate this I would like to refer to the first chapter of the third edition of the "Lehrbuch der Psychosomatischen Medizin" by Thure von Uexkuell (9).

Von Uexkuell and Wesiack attempt therein to grasp the so-called vegetative plane using the feedback mechanism as a model. The animal plane is seen as the emergent quality of the vegetative.

This is the next higher level of integration, which is said to be more complex than the feedback mechanism. Von Uexkuell and Wesiack then construct the functional feedback model to fulfill the perceived need.

The human plane, an even higher and more complex level of integration, requires the authors to construct the situational feedback model. In so doing, they emphasize the increasing role of historicity the higher the level of integration. The theory of evolution offers an explanation of the variety of methods within medical science of which we have offered a brief description. This concept is indeed embedded in this sort of variety, requiring as it does variations and mutations in order for natural selection to lead to further development. In and of itself, this way of grasping science has, however, already left the world of Hempel-Oppenheim behind. "Once the nexus of cause and effect has been relaced by the interplay of mutation and selection, predictions about the future are only possible in the form of descriptions of trends and no longer as prognoses as understood by the Hempel-Oppenheim model". (10)

A kind of intuitive integration of these variegrated elements has already developed within medical practice in the confrontation between doctor and patient. The physician sees the illness and the person who is ill. This total view of things is becoming something of a rarity due to increased specialisation, which is also true of our medical studies. Students are confronted by a plethora of specialised subjects. Their days are full. They are bombarded by isolated bits of knowledge. No time is left to them to reflect on the basic situation of being a doctor.
This deficit can only partly be made up for by a heavier emphasis on practice during one's studies: learning by actually working with patients and applying the case method.

A further requirement would be to become consciously aware of the limitations of the methods applied in medical practice. All conceptions about knowledge have their limits. Not until one reflects upon these can one develop an awareness of their significance as integrated elements in a larger picture.

In closing, I would briefly like to touch upon a basic difficulty standing in the way of a holistic understanding of a person suffering from an illness.

Let us return to Kant's treatment of ideas again. The idea is a necessary concept of reason, which states the unity of an object of pure reason which cannot be perceived. This is always the case when the knowing subject is a part of the object of knowledge. The basic situation of the knowing subject is that it can never become the objective object of its own knowledge, in spite of the fact that the subject's own unity, in the sense of being a necessary term of reason, is an absolute prerequisite for each and every act of knowing on its part. This prerequisite, which Kantian terminology would label an idea, does not in fact empower one to make any statements about the empirical actuality of any person. Referring to the case at hand: since illness is the illness of a person, the sick person's statement about his/her illness must be heard if it is to be understood completely which statement lies outside the field of scientific objectivity.

The same difficulty arises in conjunction with the ascending series quoted above, from "feedback" to "functional feedback" to "situational feedback". As helpful to our understanding as they may be, they are not as completely operatonal as the notion of the feedback mechanism. Whereas the "feedback mechanism" can be subjected to a thorough logical analysis, this is not true of the "functional feedback model" and the "situational feedback model". Seen in this way, they remain mere metaphors for what were defined as the animal and the human planes.

The failure of our dual logic or probability theory logic with its true/false scheme in analysing so-called "autoreferential systems" (8; 11; 12; 13) is revealed by an example of the logical implications.

The specific achievement of autoreferential systems is reflection, that is, the creation of an image of their environment while retaining the ability to differentiate between themselves, the image-creating relationship and what they have created an image of. This process is in part circular and not transitive.

And there lies the rub. A deductive conclusion is based on the structure of its logical implication. The principle of transitivity holds absolutely for such implications, at least in the case of dual value calculations. Thus we cannot use deductive conclusions to describe circular processes.

Put in a different way: the logic of substances, with its classic axioms of identity, forbidden contradiction, excluded third propostions as well as the law of sufficient grounds, upon which transitivity of implications is based, can only perceive circular processes as meaningful if they can be reduced to purposeful events, for example, if they can be fitted together to a chain that can be interpreted teleologically or causally. What such an interpretation succeeds in grasping is, however, only a calculable result which is thus a special case of reflection and in no way the process of reflection itself.

As long as comprehensive understanding of an autoreferential system remains outside the limits of our logic we will have to get used to a scientific pluralism that does, however, have one important advantage for medicine, namely that it prevents it from falling prey to reductionism.

The implications for medical studies are that the patient will have to become the central theme of our education to a much greater extent than heretofore, and that philosophical reflection covering the field as a whole - at present non-existant - is necessary, especially in view of the great mass of material to be learned.

The splitting up of specialised knowledge into separate subjects should be ordered and integrated with a view to the reality of the individual patient. Such an integrated view of the subject matter can only be achieved through work on concrete cases. Responsible work within the individual disciplines is only possible if the limits of their methods are known.

The role of scientific thinking in medical education should be to make us aware of these limits.

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SESSION II:

SCIENTIFIC THINKING IN MEDICAL EDUCATION - EXAMPLES AND APPLICATIONS -

PARALLEL WORKSHOPS

WORKSHOP A: MOLECULAR AND CELLULAR LEVEL

Chairman: Prof. E.J. Speckmann (FRG)

Author: Darek Gawronski (Poland)

The discussion approached from different viewpoints three main aspects of the theme: starting a new subject, its aims or objectives and structure of knowledge to be presented and possibly acquired by the student.

The students' naivety at the beginning of various courses is often so great that they are not able to formulate appropriate questions in the context of knowledge presumably acquired in previous courses or at secondary school. Thus it seems reasonable to give essentials at the beginning and to review relevant information from previous courses.

Teachers should be familiar with the aims of the course. These aims should be presented to the students and then evaluated at the end of the course with an exam. Since students must in any case learn what is required for the exams, why not make it clear what the common goals of the teacher are and those being taught? The information content of the subjects should aim at future health needs, while the type of education should be student-oriented.

Defining the goals is the responsibility of the teachers, but the way in which the goals are to be attained is left up to the students. The crucial point is feedback from the students and graduates on the relevance and applicability of the skills and information aimed at in the particular course. Both topics and methods need to be changed in light of national health priorities and problem solving.

The structure of knowledge seems to be related directly to its longevity in the minds of the students. The superficial knowledge of vast amounts of facts acquired directly prior to an exam are easily and quickly forgotten, partly because they have not been understood and only memorized. A remedy for this could be the problem solving approach, which is likely to be more time consuming and require the selection of important topics, because things understood tend to be part of a person's own thoughts and ideas. Using concepts acquired in early courses is rare in clinical subjects and thus raises a stipulate of integration, the level of which is still not clear as the organ level seems insufficiently low in terms of the holistic approach to the patients. The transition of the intellectual environment between the basic medical and clinical subjects seems to be artificial and to result from not judging the relevance of these two main groups of sciences to the final outcome of medical education, i.e. in most instances general practitioner.

Reform in medical education is necessary, in general terms evident, centered on making students able to solve clinical problems. However, there is an inherent risk in drastic (revolutionary) changes, and the quality at stake is the physician's competence in treating patients. Fortunately, two types of medical schools now exist. There are the traditional ones and the problem-based and self-directed ones, which allow us to gather experience and to compare and use it for making changes. From a practical viewpoint it is advised that the traditional, discipline-oriented faculties introduce the problem oriented approach earlier and in greater quantity. It is important to preserve competence in clinically relevant areas of the basic medical sciences, such as molecular biology and biochemistry, which are indispensable for the correct solving of problems.

Our proposal is to give students the opportunity to take a scientific leave of a term or a year during their studies to pursue the desired problem (quite probably a scientific one). We know that students on their own add an extra load of this kind during their years of study. We advocate a change in attitude towards students who will use the proposed opportunity, regarding them as scientists willing to pay a price for postponing their graduation in order to contribute to medical knowledge.

WORKSHOP B:

ORGAN LEVEL

Example: Function of the Heart, Circulatory System and the Blood

No Report

WORKSHOP C:

LEVEL OF THE INDIVIDUAL

Example: Prevention and Treatment of Arterial Hypertension

No Report

WORKSHOP D:

HOW TO ORGANIZE AND DEVELOP TEACHING AND LEARNING IN FAMILY MEDICINE, USING THE EXAMPLE OF THE GERIATRIC PATIENT

Chairman: Prof. K. Jork, Frankfurt a.M. (FRG)

1. Problem definition and objectives
2. Group work
3. Discussion
4. Summary

1. Problem definition and objectives

The group discussion focussed on the issue what actually scientific thinking in family medicine is and how to define it in the best way. The group came to the conclusion that mere **scientific understanding** should be supplemented by the knowledge and experience drawn from the social and behavioural sciences.

Problem solving in family medicine should then give the student the opportunity to obtain insight into the biophysical **and** psychosocial aspects of the elderly patient and at the same time develop, apply and evaluate different avenues of problem solving.

The student's purely clinical knowledge should be supplemented by emphasizing the **significance environmental factors** have on health and illness, such as real life **family situations** offer. Under professional guidance by an experienced doctor the student would like to get actively involved in out-patient care. This endeavour could best be realized by having a student care for an elderly patient in his family environment over a certain period of time.

A clear and precise definition of what psychosocial learning was necessary, and along these lines a teaching strategy should be designed which will take into account scientific thinking and at the same time exemplify how to practice family medicine in the best way, specifically here when caring for a geriatric patient. Our objectives then were.

1. to gain insight into the nature of illness and disease together with their effects on organs and organ systems.
2. to collect experience in terms of any psychological and psychosocial reactions the patient or his doctor might have. Here, the patient's psychosocial situation will be taken into account and incorporated in the overall treatment plan.

2. Group work

First the group presented and discussed what psychosocial learning means. According to the given SOEP-anamnestic scheme the patient's subjective statements and the personal impressions the observing student or doctor has are collected, stating all contributing physical, emotional and social aspects (S). Subsequently, all objective data and findings pertaining to these three areas should be listed (O). With taking into account all these factors it will be necessary to reevaluate (E) all past decisions in terms of their validity and then design and implement any future measures and procedures (P). Scientific thinking here extends beyond the purely natural sciences by also applying **empirical thinking** (experience) as well as the **laws of probability.**

Teaching experience also requires giving instruction in **problem solving steps**: After the problem has been defined and described, it should be analysed. According to this pattern the various possibilities of problem solving should be examined. After the evaluation an overall treatment plan should be developed and applied.

When caring for the patient the primary goal of family medicine is to help sustain the patient's **autonomy, his social integration and to prevent any somatic fixation.** To achieve this, insight into behavioural concepts are significant. Also, too rigid authority and control which the care giver may exert over the patient and which will only foster the patient's disability and dependence, should be detected and counteracted. The concept of **help through self-help** may be effectively supported by a physiotherapist, ergotherapist, or occupational therapist living close by. **The healthy family in fact is not the one who does**

not have any problems, but rather the one who knows how to cope with them. The treatment of chronic states of disease or illness in the geriatric patient requires an attitude from patient and doctor that will promote active coping strategies rather than nurturing a passive, subdued life style which would only increase disability.

The medical student in his long-term contact with families caring for chronically ill, bed-ridden patients, will get acquainted with all aspects of home care and how to apply problem solving effectively. To support the care provider he needs knowledge.

1. how to prevent decubitus,
   exciccosis,
   infections of the urinalry tract,
   contractions.
2. He needs to re-assess the
   effectiveness of the current therapy,
3. check the strain on the person(s)
   who are taking care of the patient.

The **effectiveness of the person taking care of the patient will be limited** by:

too little time for recuperation	77 %
too little social contacts, such as to friends	51 %
deterioration of his/her own health	37 %.

The most frequent and significant strains on the person providing care primarily are:

the state of health of the patient	60 %
the uncertainty about what the future may bring	53 %
the emotional condition of the patient	51 %
the constant physical presence of the patient	41 %.

The group did not compile a complete catalogue **listing essential elements** on teaching and learning scientific thinking in family medicine, specifically in the long-term care of the geriatric patient. Such a task would require a collection of data describing past experience drawn from various approaches used in the past. The patient also would need to be considered in his **somatic, psychosomatic, emotional, psychosocial and socio-medical concerns and orientation.**

3. Discussion

After having defined the essentials how to develop scientific thinking in family medicine in the best way, the group had to think about **effective teaching approaches** and **methods** and how to best convey them to the student.

For this task the approach **"long-term care and follow-up observation of the course of the disease"** as part of the Frankfurt model "practice oriented medical education" was introduced and discussed.

Over the course of one semester students will care for chronically sick people in the patient's family environment. The goal of this practical exercise is to acquire the skills of effective problem solving when treating complaints such as "unwellness", general discomfort of mainly psychosocial origins as well as conflict situations in out-patient care.

After having been **introduced** by the family physician the student will visit a chronically ill geriatric patient for 1 to 3 days every two weeks in the patient's home. During his first visit the student will discuss with his patient their professional relationship, its time limitation, and what they may expect from one another. In the interim week where treatment does not take place, each student will meet with a group of up to four students under the guidance of a psychosocially trained physician. These groups will discuss student-patient-contacts, describe and analyse problem situations and aim for finding suitable solutions to the given problem.

During the home visits a **work** sheet will serve to write down the student's observations, perceptions, and findings. Then, problem solving suggestions on an interdisciplinary level are made and evaluated, taking into account the patients ability to cope with disease and illness.

Group members reported that in Sweden the medical student works with a family for one week. Problem situations such as the broken family, the unemployment family or drug- and/or alcohol-related conflicts are discussed with an observing student, aided by the use of video tape.

The group came to the conclusion that instead of "scientific thinking" the term "problem solving behaviour" would be more appropriate to be used during lectures. As we are actually more than "researchers" our motivation is important to

us and bisides this the problem how to find. Important to us is our motivation and how to find the right answers to the question: "How is behaviour in a psychosocial system measured in the best way and documented?" The "teacher" here may not even be the best person to impart such **capabilities**, for studying and **learning behaviour takes time**. The medical student of the present is busy with studying and memorizing facts. The unsolved issue remains, how to best acquire problem solving behaviour.
In medical studies, our current academic courses neglect **problem oriented learning**. Simultaneously, there are not sufficiently reliable research data on family medicine available. Only insufficiently differentiated **methods on how to handle problems of the psychosocial system** are taught so far. Already a differentiation of the **qualitative** and the **quantitative** could be helpful here.

Parallel to studying the natural sciences the student needs to practice problem solving behaviour at the beginning, during and at the end of his medical studies. "Life experience is half the job" was a fitting statement.
The student feels that the **study of medicine** is not comprehensive enough since it currently lacks the following:

1. The **epidemiological significance** of many diseases and problems of family medicine are insufficiently taught.
2. Students do not get enough insight into the **contributing environmental factors** upon disease and illness development.

Another complaint was that, fostered by the predominantly clinical thinking structure at the universities, students generally tend to show a stronger interest in the data of natural sciences. The question remains: How can one be **motivated** to learn and think in relationships and interactions? The integration of patient collectives and the **long-term care** of the individual patient as a significant component of the studies of medicine were discussed. As one group member commented, "these issues will have to be faced and solved by a new type of physician". The necessary basis for this would be an interdisciplinary structure as well as a different way of distributing the available resources.

4. Summary

To learn about scientific thinking in family medicine, the medical student will not only have to consider natural scientific, but also psychosocial aspects and methods.

Scientific thinking primarily is concerned with the problem solving of complex human conditions, as they are obvious in the various forms of human relationships. The acquisition of knowledge about illness and disease should be supplemented by obtaining insight and experience in how psychological and psychosocial reactions and conflicts may be contributing to ill health. The family doctor should strive for maintaining the patient's autonomy, independence and integration, and also prevent a somatic fixation. An effective approach to reduce the existing deficit in medical education would be to offer problem oriented learning and a more practice-oriented way of teaching. This would include long-term care and follow-up checks on the course of disease within the patient's family environment.

WORKSHOP E:

LEVEL OF THE COMMUNITY: CARE OF ADDICTS

Chairman: S. Wilm
Authors: A. Fairhurst-Winstanley and S. Wilm

Following the publication of the Alma-Ata Declaration on Primary Health Care in September 1978 and the development of the "Health for all by the year 2000"-movement, most European countries began to move towards increasing community oriented primary care and health promotion. Medical education should, accordingly, reflect these changing concepts of medicine and become more oriented to the needs of the community, leaving behind its exclusively hospital oriented, curative approach.

Being aware of the unique historical situation having passed exactly 11 years since the Alma-Ata Declaration and having to go another 11 years until the year 2000, our group, consisting of 17 medical teachers and medical students from 7 European countries, discussed the general problems of community medicine and, specifically, the ways in which scientific thinking can be incorporated into and encouraged in the teaching of community medicine. The particular example specified in the workshop was the care of addicts in the community.

We recognized the need to insert a course in community medicine into each traditional curriculum to start a step-by-step reorientation towards community-based medical education instead of designing a completely new track or school for communityêoriented health sciences. We attempted to define what the aims and objectives of such a course in community medicine should be for the student. Some of our suggestions included the following:

- the need for the students to appreciate and be trained in the cooperative and multiprofessional approach to community care by multiprofessional education,

- the realization that doctors must function in association with many other professional and participating lay groups in the community, some of which may be regarded as being more important than the doctors themselves,

- the recognition that it is preferable to practice preventive medicine and active health promotion rather than overemphasising curative medicine.

Regarding the treatment of addicts in the community, it was felt that the following were some important components for the students to be included in the model for community medicine:

- communication skills,

- the development of an appropriate and realistic attitude towards the addict and towards themselves, in particular appreciating the limits and extent of their own influence,

- the identification and exploring of the parts of their own personality endangered by addiction, by this learning to be non-judgemental,

- a knowledge of the community network of support systems (e.g. self-aid groups) and mediating structures.

A number of ways of stimulating and training scientific thinking in such a programme were discussed:

1. We heard how in Norway and Poland students are being encouraged to pursue a research topic on a matter related to the community (e.g. addiction); in so doing, they can learn in practice how to make use of scientific thinking in using a scientific methodology such as epidemiology. Such a research topic could easily offer exemption from an examination as an incentive to understand the importance of scientific thinking.

2. We saw how, in a community practice in the Federal Republic of Germany, use of self-aid groups is made in the treatment of addicts. It was agreed that, if the medical students themselves were required to participate in self-discussion groups in the first two years of their medical education, and, later on, in junior Balint groups, they could learn not only about communication

skills but also about the theory of communication and the scientific process to analyze interpersonal relations.

3. A rotation of some kind in community medicine like in Great Britain or Sweden, e.g. with a G.P., at a health centre or as long term care for families, is essential. Before this, specific aims should be set and the attention of students drawn to the most important theoretical issues like the complex scientific concepts of social support and social networks. Afterwards a full de-briefing should occur which will allow the opportunity for reinforcement and reflection of scientific thinking.

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The Context of the 1988 Edinburgh Declaration of the World Federation for Medical Education in Health Policy - "Health for All by the Year 2000"

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Since the beginning of the seventies world-wide a trend to return to or consider new a broader primary health care developed. It found its roots in the criticism of the exclusively biomedically oriented, curative, uncontrolled cost exploding, tertiary care preferring health care system. The most important international manifestation of this development is the conference of the World Health Organization (WHO) on primary health care in Alma-Ata, USSR, in September 1978; the Declaration (7) has been signed by all European nations. Primary health care is not meant only as medical care but as a comprehensive health care close to the community and as a treatment of each member of the family in an acceptable and also financially attainable way deliberately stressing self responsibility.

Already since 1973 this fundamental change has been outlined in the ideas of the WHO. The World Health Assembly in May 1975 adopted the programme of "primary health care" growing from international studies (2,4). By this adoption the reorientation of the worldwide health policy was officially performed. The aim of this reorientation was summed up in the motto "Health for all by the year 2000" and accepted during the 30th World Health Assembly in May 1977.

Between 1975 and 1978 the new concepts were discussed in all of the six regions of WHO, and the reports of the regional directors of WHO (5) formed a basis for the 1978 Alma-Ata conference.

The participants of this conference knew very well that the Alma-Ata declaration was not applicable as a model for organization to all nations worldwide. It was meant as a first strategy to reach the aim "Health for all by the year 2000". Explicitly the formulation of adjusted regional and national strategies was called for (8).

The WHO Regional Committee for Europe passed the regional strategy for Europe in 1980 in Fes, Morocco (11), and since then it was detailed out in several papers.

In 1984, 38 targets for "Health for all" were compiled, each to be used to monitor and evaluate the progress being made to reach the goal "Health for all" (13).

Four principles mark the European regional strategy and can be condensed from the Alma-Ata declaration suitable to Western developed countries (3):

- Health care should be related to the needs of the population;
- consumers should participate, individually and collectively, in the planning and implementation of health care;
- the fullest use must be made of available resources; primary health care is not an isolated approach, but the most local part of a comprehensive health system.

Already in 1975 the OECD-Report "New Directions in Education for Changing Health Care Systems" (1) had declared that a reorientation in the scope of health care is closely connected to a corresponding reorientation of the educational system. By its "Mobilizing Universities for Health"-programme, WHO is trying to utilize the rich and vast untapped resources of universities for the "Health for all 2000"-concept. Theme of the technical discussions during the 37th World Health Assembly therefore was "the role of the universities and the strategies for health for all". In a resolution (9) member states were urged to support universities in orienting the education and training of workers in health and related fields towards the attainment of health for all. Universities throughout the world were invited

- to provide the kind of education and training for students and postgraduates in the health and related disciplines that will prepare them socially to meet the health needs of the people they are to serve;
- to conduct biomedical, epidemiological, technological, social, economic and behavioural research required to prepare and carry out strategies for health for all;
- to place themselves at the disposal of communities to the maximum of their

capacity for the promotion of health and provision of health care.

By this, the three major components of the health sector - services, manpower, universities - are to be connected.

In the European region the field of primary medical care is to be the root from which the new elements of primary health care can grow (12).

Primary health care is the main instrument with which to reach the 1977 WHO goal "Health for all by the year 2000". Essential components of the new public health movement are
- community orientation,
- participation,
- cooperation and
- intersectoral action.

Growing concern has been given to the importance of strengthening prevention and health promotion in public health. This has led to the 1986 Ottawa declaration on health promotion (10). Health promotion is the process of enabling people to increase control over and to improve their health. This perspective is derived from a conception of "health" as the extent to which an individual or group is able, on the one hand, to realize aspirations and satisfy needs; and, on the other hand, to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living; it is a positive concept emphasizing social and personal resources, as well as physical capacities.

The main principles of health promotion include the following:
- Health promotion involves the population as a whole in the context of their everyday life, rather than focussing on people at risk for specific diseases.
- Health promotion is directed towards action on the determinants or causes of health.
- Health promotion combines diverse, but complementary methods or approaches.
- Health promotion aims particularly at effective and concrete public participation.
- Health professionals - particularly in primary health care - have an important role in nurturing and enabling health promotion.

These principles are to be applied to the following areas:
- access to health;
- development of an environment conducive to health;
- strengthening of social networks and social supports;
- promoting positive health behaviour and appropriate coping strategies;
- increasing knowledge and disseminating information (14).

The World Federation for Medical Education in 1988 has pledged to work for reaching a reorientation in medical education outlined in the Edinburgh Declaration (6). It states that many improvements can be achieved by actions within the medical school itself. It is possible to
- enlarge the range of settings in which educational programmes are conducted, to include all health resources of the community, not hospitals alone;
- complement instruction about the management of patients with increased emphasis on promotion of health and prevention of disease;
- persue integration of education in science and education in practice, also using problem-solving in clinical and community settings as a base for learning.

Other improvements require wider involvement in order to:
- encourage and facilitate cooperation between the ministries of health, ministries of education, community health services and other relevant bodies in joint policy development, programme planning, implementation and review;
- increase the opportunity for joint learning, research and service with other health and health related professions, as part of the training for team work.

These recommendations were discussed during the World Health Assembly at its meeting in Geneva in May 1989. It is expected that the Edinburgh Declaration will have the influence in medical education which the Alma-Ata Declaration has had in the field of health care.

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Can the Social Epidemiological Concepts on Social Support and Social Networks be Used as an Example to Stimulate and Train Scientific Thinking in Medical Education?

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In 1984 the "Panel on the general professional education of the physician and college preparation for medicine" (GPEP) reported to the Association of the American Medical Colleges (AAMC) on "Physicians for the 21st century".

Among other things, it is recommended that medical faculties should offer educational experience that requires students to be active, independent learners and problem solvers, rather than passive recipients of information. Medical students must be encouraged to develop skills to learn independently because physicians must solve clinical problems that do not always fit classical patterns, as well as gather and apply new knowledge and technology to diagnose and treat classical clinical problems. Problem solving involves a high order of intellectual activity; it requires knowledge of basic concepts and principles and skills in obtaining and correlating information (7).

Medical students should be enabled not only to know how and to train to cooperate with other health and health related professions as stated in the Edinburgh Declaration of World Federation for Medical Education (9), but to understand the necessity and complex structure of cooperation.

Both problem solving and cooperation abilities are prerequisites for training scientific thinking in medical education. Analyzing, describing and working with the social epidemiological concepts of social support and social networks in a community can foster this process in medical students.

In the frame of the present change of paradigms in health (6) the opinion is growing that health and illness can be seen in a bio-psycho-social view (4) as multicausal and interactively dependent, dynamic, only systematical understandable phenomena. Social support has an important independent influence on the physical and emotional well-being of the individual in this net of factors (2, 3, 5, 8). An individual owning an adequate number of social relations of adequate intensity and quality seems to be better protected against illness, premature death and negative consequences of life events than an individual without the adequate number of such social contacts. Social support is delivered in the individual social network including contacts to family members, relatives, friends, neighbours and colleagues in the communities. It covers trustful talks, friendly gatherings, appreciation in the family or practical help to cope with sorrow, fears, and loneliness. Together with personality factors and coping skills social networks and social support systems could be described as "psycho-social immune systems" (1) protecting the individual from emotional and physical harm or helping him to cope with the consequences.

These complex social epidemiological concepts are essential components in community oriented primary care (COCP). They can be used to train scientific thinking in community-based medical education through participation in a research project in cooperation with other health workers, e.g. by independently designing a programme for prevention and health promotion in a community using the existing social networks.

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The Role of Universities in the WHO Strategies for "Health for All by the Year 2000"

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Administration expects from university science in general a sort of "watchers function" regarding civilizational risks in a context: Living in a "Healthy City", living in a risk society.
Healthy City Project does not influence predominantly psychosocial conditions people are living in, acting and reacting according to their individual ability to cope with stress in working conditions and in interpersonal relations with behavioural problems all influencing people's health status in general and in particular in a crisis in the course of life from infancy to old age. The coping strategies used are partly inherited with psychological skills of individual personality and her development status at the time of a crisis, partly taught by living in a social class, in a social surrounding with a certain amount of social support and by education.
Thus science has not to be seen anonymously but has to get a broader definition meaning:

- wisdom with emotional and literal quality
- giving place to hope and solidarity in a better quality of life
- more emphasis on the influence of social conditions on personality and behaviour
- the ability to answer untypical questions not asked by a user-oriented science
- handle hypotheses of outsiders critically.

Instead of science in the common sense administration's expectations towards university is deliberation in the processes of decision-making. There is also a great need for decision-makers to know about evaluation strategies and economics e.g. benefit-cost analysis, cost-effectiveness analysis and multiattribute utility theory.

From a view of health politics comes the search for priority of risks regarding the variety of health risks. This is a dangerous question.
Acceptance in society regarding prevention and standards of prevention have to meet two criteria:

- to be scientifically truly made
- to meet the will of people democratically.

The most important common point of both in this discussion is:
- to avoid a senseless burden to people.
Therefore administration expects from university in its discussion of health risks not to be overwhelmed by a risk priority searching but a begin to discuss the complex question of users priority.
Do we need tobacco?
Do we need a public relations strategy by the tobacco industry of nearly 500 million Deutscg Marks a year to sell 117 billion cigarettes?

Analyzing the toxicologic term "acceptable daily intake" in concern telling consumers not to be endangered in their health capacity the question arises: What is acceptable to whom? "Acceptable" is a term not to define scientifically but an expression meeting everybodys standards individually.

What is acceptable to a producer of cigarettes and alcoholics must not be acceptable to the users and normally is not acceptable to them but is being made acceptable to them by the influence of PR-strategies.

Living in a risk society requires community participation. Community participation means to accept a difference between scientific truth and practical truth by university science by starting to deal more with the practical problems in community and influence the priority setting in health risks. The priorities naturally do not depend only on scientific criteria but also on the organizational level of the community. Here the WHO concept of "Healthy City Project" and "Healthy Public Policy" have their central influences.

In this context health promotion on the community level is of greatest public interest and its complex questions will be answered by stronger cooperation between the administration and university.

WORKSHOP F:

THE CLINICAL WARD, CLERKSHIP OR INTERNSHIP EXAMPLE: CLINICAL WORKSHOP

Chairman: Heiner Busch (FRG), Paulo Sa Rodrigues (Portugal)

Because of the complexity of the subject "Scientific thinking in medical education", the members of the workshop decided to divide the workshop into three major parts.

The main idea of the workshop was to leave aside the purely theoretical discussion of the given problem and to focus on the real existing problems.

This goal was reached by interviewing students at their work in various departments of Internal Medicine at the University of Muenster, searching for solutions to the problem of implementation of the kind of scientific thinking discussed in the initial, more theoretical part of the workshop.

At the end of the workshop, the participants came together again to discuss their findings and to find a possible solution to the discrepancy between theory and practice.

During the first part of the workshop, a possible definition of "scientific thinking" was decided upon after much discussion. Scientific thinking is the process of making adequate decisions with inadequate information. It means finding a solution to a problem by using scientific methods, acquired knowledge and one's own experiences including:

- the capacity for self-intiated, independent learning effectiveness in establishing trust-based, empathetic relationships
- the ability to identify and solve complex clinical problems the formulation of tentative hypotheses which serve to guide further inquiry
- the collection of information in an objective way, without selecting only the findings which support the currentlyéheld hypothesis
- avoidance of overinterpretation of the findings
- the use of information concerning
  - the relation of findings to conditions
  - the relative frequency of different conditions (ie. population rates)
  - the particular characteristics of those conditions which carry a severe risk, even if their rate of occurence is low.

In the second part of the workshop, the participants then tried to apply this definition to the daily work of students in their final clinical year of studies. It is not surprising that the definition was rarely used by the students in their daily routine work. The participants agreed that this fact is typical not only for Muenster, but for most European medical faculties.

In the third part, the workshop came to the following conclusions:

There are three levels of Medical Education where changes are necessary, and according to participants, are easily achievable:

- **the level of instruction**
- **the level of students**
- **the level of the institution**

Teacher instruction has to be improved by creating **Medical Education Departments** in all faculties to direct **teacher training programs** and **systematic evaluation of the teaching quality** using student feedback. The workshop participants affirmed that the evaluation results must have obvious consequences (positive/negative) on those who are responsible for medical education.

Regarding the level of students, the workshop felt that students must increase spontaneous interaction with teachers. They must define their own learning goals, especially during the internship, and stimulate teachers to help them reach their goals.

In terms of the level of institutions, Medical Education must become as important as research programs in other fields. The majority of the participants agreed that in future, no teacher should be employed at a medical school without having passed a teacher training program.

If all these points are realized, scientific thinking will be implemented, perhaps automatically, and even in the internship.

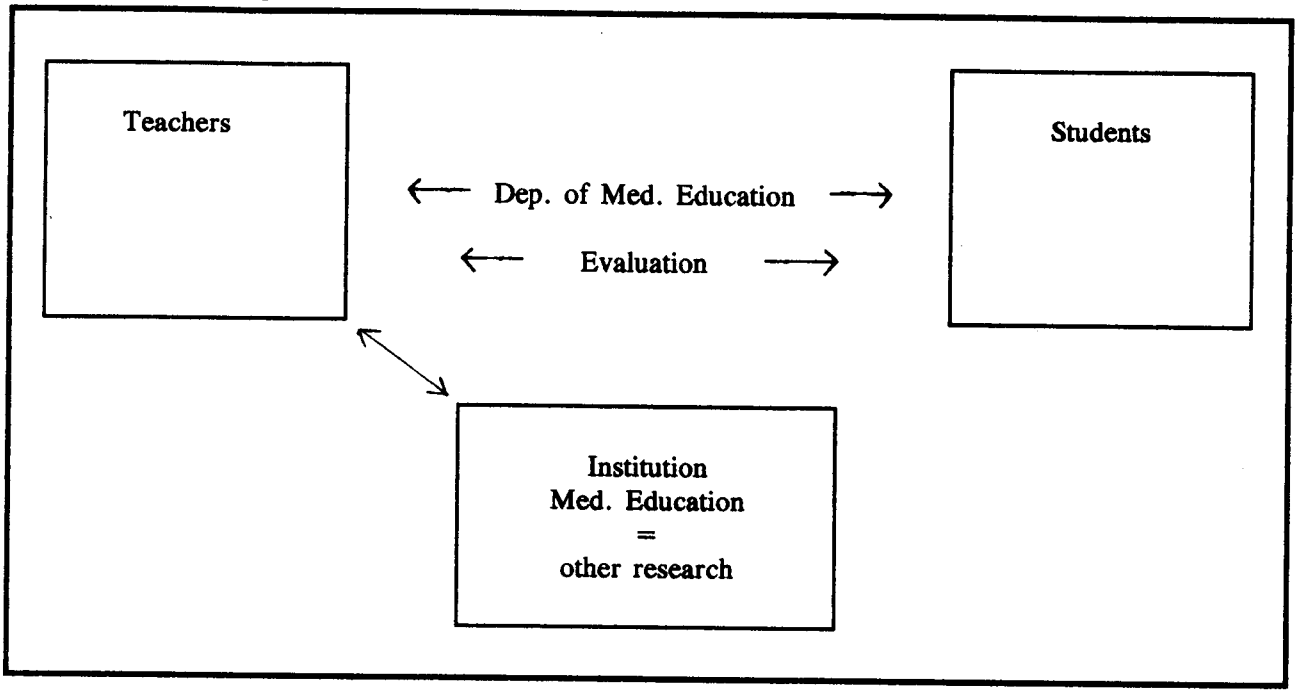

Figure 1.

WORKSHOP G:

STUDENTS' PARTICIPATION IN RESEARCH

Examples of an epidemiological study, a clinical drug trial, or a study of quality assurance

Chairman: Prof. V. Janousek (Czechoslovakia)

Our group and workshop on students' participation in research discussed very thoroughly these problems and we think that there are two indispensible factors in medical education:

A) The teacher and B) the student and the relationship or better said the interaction between them, determines to a great extent the outcome, that is, whether young physicians, young graduates are well prepared for their future tasks, whether they are prepared for self-development, for postgraduate training and eventually for life-long learning. There is no doubt that scientific thinking is one of the very important aspects in medical education and in a medical profession itself. Physicians must in their daily practice use scientific thinking and must analyse the problem. They must formulate the problem and propose a solution. They must act.

From the main aspect of our task the fundamental question was: What makes a student participate in research? We have come to the conclusion that there are two kinds of students. One, in the minority, is really motivated in doing research and spends hours in the labaratory. The other, in the majority, is not interested in doing research and after graduation, aims to go into the health service.

We dealt a little bit with the first group and came to the conclusion that even the very motivated students interested in doing research can be divided into two groups. One group contains students who participate in research because they expect a higher evaluation and because they feel that participating in research gives them better standing. After all, the German experience shows that there is a difference between Arzt and Doctor of Medicine.

And then of course there is the second subgroup: those students who are genuinely interested in research. This group is an especially important one, because besides other things it is a very important valuable source of teaching in basic sciences, in basic subjects. It is something which could be called a self-renewal of a teaching staff in basic sciences.

We discussed several models which might solve the problem of giving possibilities to those students. We feel that we have to offer the students the possiblity to participate in research and that we have to expose the students to scientific thinking. In the first group, the American Model was referred to, as it was described in the recent journal of the National Cancer Institute, and then the European experience was described. It referred to a combined German experience from both the Federal Republic and the GDR, and to the Czechoslovakian experience.

Besides other questions, the organizing of the so-called scientific conferences of medial students was discussed to some extent. There are some countries such as Czechoslovakia, Hungary, the GDR and Poland, where students themselves organize scientific conferences once a year on a faculty basis. The best papers are delivered on a national or state basis, and even participants from other countries are present. In Czechoslovakia the students go practically every year to Hungary. Quite recently, as you might know, the European Scientific Conference was held in Istanbul.

All students, that is, the "normal students", must be exposed to scientific thinking. We appreciate the Dutch contribution with evaluating the scientific projects, which every student in the fourth year has to deliver.

There were some interesting conclusions in this study group. We came to the conclusion that there are great differences in Europe regarding the opportunity for students to participate in research, but there are similarities. We would like to suggest to the Executive Committee of AMEE to give room or more space for the continuation of this workshop, because we feel that it is a very important aspect of AMEE activities, especially if we consider the main topic of the Budapest meeting. Perhaps one of the themes should be the students participation in research.

Scientific Training During the Medical Curriculum

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Introduction

In this presentation I will share with you the experience we have obtained with a short scientific training period in which students are involved in research. After the introduction, I will briefly discuss the aims and organisation of the training, and will give you some impressions I got from the reports written. I will then try to draw conclusions.

Is research-training a mandatory part of medical education?

The answer to this question depends mostly on the view people have of the medical profession. Often the medical profession is seen as applied science at the utmost, in which the outcomes of scientific research performed by others is used. This medical scientific work is done partly by people from other disciplines and partly by a minority of the medical profession that by chance got involved in science.

Others answer that anyone who claims to have had academic training should have been involved in scientific work and that this is the only way to raise the medical scientific level. A counterargument is that students who are not interested in and possibly not equipped for science, are only a nuisance to their teachers although they can perform well in medical practice.

Above this, all curriculum-committees have to cope with the problem of a huge amount of knowledge which should be taught during a relatively short period of time. Should time be allocated to scientific work or should this be left to the student's initiative?

Out of all these questions compromises often arise. In our faculty, the choice was made for a short, six-week scientific training period at the end of the theoretical part of the studies, which comes at the end of the fourth year, prior to the commencement of clinical training. One can see this choice as giving the opportunity to find those students who are interested and have the capacity for scientific work, withouth bothering the staff too much with uninterested students.

Aims and Organisation

The aims of the training are:

- to become acquainted with, and to get experience in scientific methods in medico-biological and/or behavioural research in medicine.

- to phrase the outcome of the research done.

The latter goal is achieved by making a report of the research in which attention has to be given to:

- formulation of the problem
- a survey of the literature
- gathering of data
- interpretation and critical judgement of the results
- discussion and conclusions

All departments participate in the program. One can question this decision, because neither a choice is made for departments with a high scientific level nor for a certain kind of science especially appropriate for medical students. All departments are involved in the program because they are all concerned with some kind of science relevant to medicine, and every department has a task to fulfill in the faculty research-plan. The departments have to state a certain amount of scientific problems in a fixed format. All these forms are put together in a book which is in the faculty office. Students can make their choice and make an appointment with the staff member in charge. Students can also define their own project and find a staff member who is willing to give them the help they need.

Sometimes students find places in other scientific institutes in Holland or abroad. In that case, a faculty member has to judge the report given.

All reports with the approval of the staff member have to be presented at the faculty office, testifying the fulfilment of this part of the study.

All these reports are available for analysis.

Analysis of Reports

I will give you some information from the analysis made of 289 reports sent in in a two-year period by 440 students.

By mentioning these numbers, it is obvious that students sometimes work together on the same project. Most projects are done individually (57%), but several are performed in pairs (36%), some by three or four students together (Table 1).

Table 1. Number of students participating in a project.

	total	clinics	preclinics	other
1	57%	61%	50%	50%
2	36%	34%	40%	39%
3	6%	5%	9%	8%
4	1%	1%	1%	3%

A classification is made into clinical and preclinical departments, with a rest-group in which you can find the departments of medical psychology, medical philosophy, etc.

Clinical departments are favoured by the students (Table 2) with pediatrics at the top of the list. The reason for this cannot be the scientific standard of these departments. The strongest research groups are mostly found in the preclinics. It can be supposed that the interest of the students especially in this period of their studies is focussed on participation in clinical work. Perhaps this also has something to tell us about their interest in science.

Table 2. Distribution of reports.

Clinical departments	64%
Preclinical departments	24%
Other	12%

The kind of projects students work on (Table 3). Five categories are distinguished.

Table 3. Type of Research

	total	clinics	preclinics	other
litera-ture	20%	18%	16%	36%
people	30%	31%	22%	39%
retro-spective	29%	42%	6%	6%
labora-toria	19%	10%	56%	--
other	2%	--	--	19%

Research from literature is not part of the policy of the Faculty, although in some departments (philosophy, history) this form of research is common.

In the second category all projects are brought together in which both healthy and ill people are involved. Patients are only directly involved in a small number of these projects, from which data are obtained by way of physical examination or some other method. Sometimes patients are interviewed, sometimes they are asked to fill in a questionnaire. Data are often collected from fellow-students.

Particularly in clinical departments students are often set on analysing patient reports over the last years to gather data on effectiveness of a therapy or on symptoms encountered by a certain diagnosis. This type of work is mostly a kind of inventarisation. In preclinical departments laboratory research with or without animal experiments is rather common.

Some other interesting observations can be made from these reports which often have as much to tell us about the staff member in charge as about the student.

Firstly (Table 4), the formulation of the problem. In some reports no question can be found, in others the question is doubtful in my opinion. In the last case, the question cannot be stated as a scientific one, but is more or less a task given to the student to make an inventarisation of something. This kind of question is often

encountered in reports from clinical departments. It can be presumed that part of this work is done as a prestudy for the staff.

Table 4. Formulation of problem.

	total	clinics	preclinics	other
clear	54%	49%	65%	70%
doubtful	37%	40%	25%	30%
unclear	9%	10%	10%	--

Most reports are very well set-up (Table 5). Students are very proud of their work and want to use their reports as a reference for future application.

Table 5.

	total	clinics	preclinics	other
good	85%	82%	95%	other
doubtful	9%	11%	5%	--
good	5%	7%	--	--

A review of literature is not always given as it should be according to the faculty standards. This is especially omitted in clinical departments with retrospective studies (Table 6) .

Table 6

	Literature	Scientific paper
total	74%	32%
clinics	68%	29%
preclinics	90%	49%
other	90%	17%

Some reports are written like a scientific paper, as is often the case in preclinical departments.

These are the points I have collected from the reports. I haven't collected any data from teachers and students so far. It would be interesting to know something about the support given to the students by the staff-members and about the time spent on the training by students and staff. It is, however, well-known in the Faculty that most students spend much more time than the 240 hours curricular time allocated to the training by the curriculum committee.

Some students obtain results which can be published in a scientific paper or presented at a conference. Some students obtain an appointment at the department for further research.

Conclusions

I would like to make the following conclusions from the experience we have gathered:

- because of the participation of many teachers who are not all well-equipped for scientific training and who use different scientific methods, there is a great variation in the way the training is carried out.

- the training does not always meet faculty standards, especially in clinical departments.

- students who are interested in and capable of research have the opportunity to come into the picture.

- students who are less interested do not cost too much time and at least learn how patient reports should be formulated, to be of use in the retrospective studies of others.

- the time period is too short and should be lengthened to 10 weeks, to give the students the time they really need to fullfil the task given.

I would like to finish by saying that a short research training period without many rules and without very high standards can have a place in the curriculum, especially in order to select students who should get involved in future scientific research.

Standards and Borderline Values: Basic Criteria and Limitations in the Appraisal of Functional Parameters from the Medical Point of View

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Conflicts are familiar in medicine. It is not easy to resolve them and hence tendencies to sweep them under the carpet are understandable. In spite of extensive specialisation in the human sciences, such as sociology, psychology, ergonomics and anthropology etc., where the limits are reached or where the subject touches on legal aspects, the doctor assumes the role of the expert, the scientist or the judge. To an increasing extent, the doctor is required to function as a biologist far into the field of behavioural research.

The doctor's primary task is to give men and women under physical, emotional and psychosomatic stress the best possible help and advice in the circumstances (14). This ethic is modified, if not actually perverted, when scientific aspects of evaluating "functionality" are given priority.

There are areas of life which are also taboo for the doctor, areas whose limits are merely set by the laws of moral ethics or by political and social principles. Nevertheless, the doctor's outlook is still determined by the scientific view, i.e. operationalization and measurement, and this has been the case at least since medicine came to regard itself as being rooted in the natural sciences.

As Lolas wrote for a memorial symposium for Prince Auersperg in 1989, the basic metaphor in science, at least since Descartes, "...is that of the machine and clockwork. Thus nature is no longer regarded as a partner but as an object and hence not as a total entity. The basic operations in science, such as occur paradigmatically in anatomy, are dissecting, taking apart and putting together" (9). This applies to both deductive and inductive methods, i.e. generally binding principles determine from the outset which phenomena exist and should exist in science and which should not exist, a fact drawn attention to by Kuhn in 1973 (7).

The power of new paradigms to take the place of current ideas may result from the convergence of a whole series of problems affecting different areas of life and/or science in the sense of similarities on the level of deficiencies in the models. The decisive force here is a kind of suction.

The need of thinking people to introduce the holistic concept of totality in our various disciplines, encouraged in the postwar years by Viktor von Weizsäcker, who succeeded in reintroducing the subject and subjectiveness in medicine, is an attempt to counter the scientific metaphor of the machine and clockwork (15).

The limits to what can be planned in this kind of human biology based on the division of science also becomes apparent in the field of the somewhat synthetic planning of the environment, say, in the field of space travel. What is easier to understand is the problem of the world of work, where since Taylor and Mayo human areas of work are broken down and optimized in detail in order to be put together again synthetically afterwards. The idea at the back of the employer's head is to gain and retain control of the production process.

With increasing rationalization this breaking down of the reality of working life was bound to lead to a loss of productivity. The idea of the limited nature of human effort was indissoluably linked with the question of human justice (5).

Who is to judge what is reasonable? And if this is a doctor, are we aware of the danger of becoming tools of vested interests that are opposed to the doctor's ethical obligations?

We would like to give an example from an area of ophthalmology concerned with the eye and road traffic. This is a case where the above-mentioned covert conflict of interests can be demonstrated. De Jong justifiably warns of the danger of making additional demands on the visual capacities of drivers, however legitimate they might be (2).

We must first remember that cyclists, for instance, need no driver's licence, and that car drivers, who do need a licence, are allowed to continue driving - at least in Germany - in spite of impaired visual functions, as long as they do not cause any accidents or until they decide of their own free will to give up driving.

There are no statistics so far on the number of persons suffering from visual impairment who nevertheless drive a car safely and without noticeably poorer performance.

The difficulty in defining "normal visual capacity" lies in the fact that the subjective and objective problems involved in the performance of visual tasks result from the dynamic cooperation of the two eyes and the mental processing of what is seen during our actions and reactions as influenced by arousal, other mental preoccupations, fatigue and emotions. Seeing does not function automatically, rather it triggers perception which, modified by the personal mood, result in psycho-physical behaviour (4, 5, 11). The findings are generally not taken into account by the experts.

In the field of preventive medicine and occupational medicine, it is difficult to draw the dividing line between situations and performance involving risk and those without risk. Examples can be found in the fields of stress research and human ecology, etc. (10).

Let us take human ecology. In respect to our subject it is the attempt to include matters of public interest, empirical methods and theories and hence all sources of knowledge in largely converging and more or less idealistic models, thus providing both a political and scientific framework of action. It is characterized by dynamism and this means that in view of its complexity, it is only with difficulty accessible to scientific methods.

Where human ecology uses empirical methods, it imperceptibly becomes subject to the limits of systems theory with an inherent risk of a lack of definition.

Nevertheless, human ecology at least as a result of the rediscovery of time in a nonscientific sense, truly provides elements of an emerging change of paradigms in medicine. This provides the doctor with the need to assess dynamisms and functions usually far outside medical aggregations and even to bear responsibility to be responsively involved in optimizing their integrations. Here the doctor very quickly reaches the limits of his or her, as it were, classical way of thinking, since it is not a question of methods in a narrow sense of the term, and since standards are incredibly complex in these areas if it is possible for them to coexist at all. We need only think of new insights in the field of social biology, which regards groups of people as cybernetic entities and attributes individual characteristics to them, whose regulatory conditions require understanding when it is a question of apprehending individual characteristics and persuing differential research.

The classical marginal values and standards in human sciences are taken from static models, although at least the statistical moments were taken into account, albeit generally only in a rudimentary fashion. Another difficulty is the different aspects from which functionality can be interpreted, both at the semantic level and at the level of the risks involved (6).

Even if these things could be made scientifically accessible, there is still the problem of managability. Classical medical doctor-patient situations (and also teacher-student situations) do not permit this (12). New modes of thinking are therefore necessary and the prerequisites for them is that in their relationship with the patient (student), doctors (medical teachers) also display "compliance" both at the level of communication and competence.

Let us take the example of stress research: ever since it was discovered that stress can be explained not only on the baisis of Cannon's emergency reaction (1) or Selye's General Adaptation Syndrome (13), and ever since insights and theories from the field of the psychology of coping (8) as well as social psychology (3) have explained what justifies the global term "stress", a large part of what is known as stress research has consisted of the refutation of other approaches.

In medical stress research the approach base on the physiology of activation for a long time guaranteed a certain degree of success. But with the introduction of more exact insights in psychoendocrinology and psychoimmunology if not before, research has proven more difficult than expected. The days when, for example, work experiments were judged on how mean values of heart frequency or adrenalin excretion, e.g., differed within particular periods of time

or from one group to another, are past, at least at the recognized scientific level. The individual, normal range of fluctuation of even a single parameter in so-called standard situations is too large. In addition, we have had to learn that in situations where the demands of work reach a critical limit, one individual reacts with a change of circulatory functions, another for example, with immunosuppressive mechanisms, where another person displays a loss of motivation or depressive symptoms.

Very often stress research turns out to be a discouraging example of how helpless the medical scientist is in this gray area between health and disease.

It is not surprising either that stress research in the past has frequently been accused of being inexact by "reductionists", especially since the development of acceptable models taken from the everyday world in most cases are a turning-away from the classical experiment, particularly the animal experiment.

Those who are interested in this veritably indissoluble heterogenity of stress research and its implications on the level of standards in the field between health and disease are recommended to read the book by Lolas and Mayer (10).

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STUDENT'S RESEARCH IN MEDICAL EDUCATION IN THE GERMAN DEMOCRATIC REPUBLIC

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(Abstract)

Professional competence in medicine requires scientific thinking. Therefore, scientific thinking must be an integrated part in all stages of medical education and should be the ambition of teachers in all medical disciplines. Additionally, medical education in the GDR allows students to take part actively in special disciplinary or interdisciplinary research programs with the aim: - to motivate students for scientific thinking and problem solving - to learn research methods and models, handling of facts, logics and ethics and to apply these methods and principles to their own scientific tasks.

The following courses and possibilities are integrated in the curriculum: - possibility to spend at least four weeks of the compulsory year of nursing practical training before the study of medicine in a basic discipline of one's own choice (up to 10 months for special interested students) - a compulsory practical four-week training period in a basic discipline of one's own choice in the second preclinical year - collaboration in special student research groups in medical disciplines ofone's own choice - participation in scientific student meetings (at the faculty, national and international) and/or other scientific meetings.

Every student at the end of his/her studies must defend a thesis in order to receive a diploma (first academic degree) as a compulsory part of the medical studies.

WORKSHOP H:

INTERNATIONAL EXCHANGE OF STUDENTS AND TEACHERS A WAY TO STIMULATE SCIENTIFIC THINKING

Chairman: Prof. Dr. D. Habeck, Münster

Author: St. Drolshagen, Frankfurt a.M. (FRG)

Which experiences can be gained by means of international exchange of students and teachers? What is the meaning of the term 'scientific thinking' and last but not least: what has the one to do with the other? The discussion in this workshop focused on these questions, proposed a model, reported a wide range of different experiences in international exchange, named problems and suggested solutions.

Scientific Thinking

There was an intense discussion about this term 'scientific thinking' and its relationship to international exchange. At the end of the discussion a simple (possibly simplifying) model was constructed setting scientific thinking into the context of rules and regulations of a scientific community (Paul S. Kuhn; see: Tab. 1). Rules and regulations refer to processes of ***consolidation*** and ***change*** within and outside of a certain scientific community national or international. Within this context workshop members came to terms to discuss processes and problems of international exchange.

Tab. 1

Framework of the term 'Scientific Thinking' **Science is a sample of rules refering to:**
● Definition of problems
● Definition of methodology (e.g. data gathering, data processing, performance of results)
● Definition of the parameter: 'problem solved' (lege artis)
● Definition of communication rules
● Definition of controlling routines
● Definition of membership in the 'scientific community' (Paul S. Kuhn)

International Exchange

Several examples were discussed refering to students' exchange as well as to teachers' exchange.

Mr. Büttner form Erlangen (FRG) and his colleagues tried to implement a "group on history taking" (ger.: Anamnesegruppen) program in Rennes, France, with both, French and German students and reported details about the process of the program's implementation to the workshop.

At Leeds' medical school (UK) a teachers' exchange program was set up. Obstetricians and gynecologists meet regularly on the basis of workshops to exchange experiences and to improve the teaching system.

There was a consensus that international exchanges could allow insights into details of foreign medical education systems, e.g. the curriculum, teaching and learning methods such as offering learning experiences to the students in selected areas of the health-care system. Such organized learning experiences were reported from Poland where students from the third year on have the opportunity to work in low developed rural districts of Poland - a program for about 300 native and another 60 foreign students. In Turkey quite a similar program exists in the area of Primary Health Care. In Tel-Aviv an Exchange-Residency-Training program exists with English speaking staff and patients, fully compensating existing problems with Israel's native language.

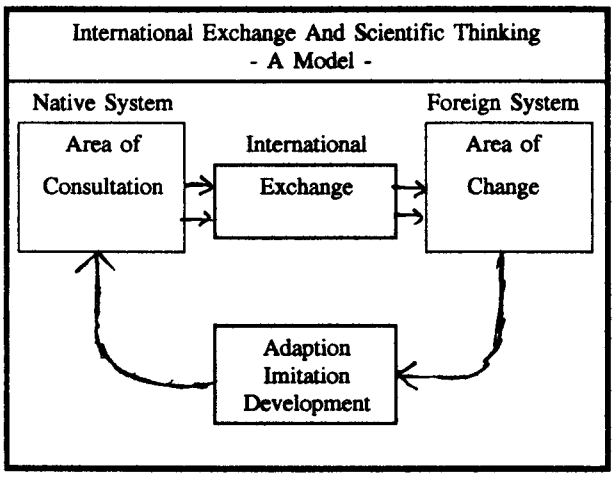
Further examples were discussed based on numerous experiences of students who went abroad. Discussion showed the extreme interest of students to gather experiences in foreign countries, experiences they couldn't make in the fairly overcrowed health system in Germany. Unfortunately the interest of foreign students to come to Germany seems to be low. However the

Karolinska Institute in Stockholm (Sweden) plans to start a student exchange program with the FRG.

In the discussion attention was drawn to the process(es) of change a system, i.e. the system of education, its development and even more to the problems many students as well as teachers are facing in making efforts concerning this change.

The comparison of experiences in foreign countries with those at home could (and should) lead to the realization and evaluation of **deviances** (Lavalle) in diagnosis and therapy. These deviances can obviously be observed best in the area of Primary Health Care - a fact which makes the work in this area very precious. The process of comparing deviant experiences can enhance reflections and possibly change in the native country. In this way, the emitting countries could profit by the exchange as well.

Tab. 2



If scientific thinking implies to "think in a critical, logical, systematic, and truthful manner and therefore to use appropriate methods", as Prof. Habeck put it in his introductory remarks to the workshop and if we add a definition of the term "scientific thinking" derived from the sociology of sciences as a "sample of rules or standards, like defining scientific problems, the methodology, and communication rules", workshop members agreed that international exchange can positively be a stimulus for scientific thinking.

Problems and suggested solutions

The discussion focused on the following crucial problems:

Problems of communicating in a foreign language, especially for students from Turkey, Iraq, Israel and other non-EC-countries. Problems not only arise when trying to understand the lectures and textbooks but especially in the doctor-patient-interaction which is stressed immensely, if the every-day-language is not adequately mastered by the student.

Financial problems of international exchange for board & lodging and insurance, especially e.g. for students from Poland or Czechoslovakia, studying in one of the West-European countries.

Structural problems of the host-country students face when they encounter less than motivated teachers, rigid bureaucracy or restrictions in the number of foreign students allowed to work in the host-country.

Further problems are caused, as many students reported, by bureaucratic state examination boards in Germany. For many courses, exams, and places no credit is given - a fact that restrains students from going abroad and contradicts the political objective of programs like the Erasmus-Scheme and others advertised in so many political speeches.

The workshop discussed possible approaches to solve these problems, not only to help the majority of highly motivated students to gain precious learning experiences in foreign countries, but to improve the transfer of knowledge and change within the EC-states as well as in non-EC-countries, especially those of Eastern Europe.

The **language-problems** can be surely overcome by having conversations with fellow students. However the universities could provide or at least support language courses in collaboration with their own language departments for those students who lack confidence in their capability.

The **financial problems** could possibly be solved by national or EC-funds. The Erasmus-Scheme can be held up as an example which includes a grant plus travelling and other expenses by the EC.

The **structural problems** seemed to be the most difficult to solve. Their solution depends directly on the international cooperation of the faculties.

This cooperation presupposes faculties' motivation and resources and implies regular meetings of both students and professors, listening carefully to each other, realizing the changes and the improvements of medical education foreign faculties already tried to perform.

So the workshop-members strongly recommended the institutionalizing of an AMEE standing commitee or group on international exchange for students and teachers in all European countries including Eastern Europe.

Establishing Anamnesegruppen Across Linguistic Borders

J. Büttner, T. Loew, A. Freitag. Universität Erlangen-Nürnberg, Germany F. Donnars, Université de Rennes, France

This report will focus on the proceedings and special problems we had in introducing Anamnesegruppen in Rennes, France. Anamnesegruppen are so-called "peer groups in history-taking", or groups provided from students for students to train in history-taking. In this history-taking, all aspects such as biological, psychological and social are integrated, as we learned from G. Engel or R. Adler.

The announcement in Rennes for the first Anamnesegruppe in France included a short comic strip from the French cartoonist Binet It showed a situation in a hospital room; a young assistant introduces a patient by name to a professor who is standing among a group of students. However, the professor is only interested in the patient's illness and asks for more data from the assistant, and then teaches the students. The patient is not involved and only dares to say a shy "hello". Only when the professor asks the patient to fart, which is noted with the exact time, can he affirm the question. This cartoon might be exaggerated, but it shows the intention of the Anamnesegruppen: to speak with the patients and not about them.

How was it that the Anamnesegruppen, originally a German devolopment, came to Rennes in France?

I would first like to illustrate the necessary conditions for establishing Anamnesegruppen at a new university. Anamnesegruppen are a young development and, a new feature, they exist on the initiative of students. Therefore it is not as easy to establish Anamnesegruppen as it is with other lectures held by a professor. I see two possibilities for a start in a new town:

1) a member of an Anamnesegruppe transfers universities and brings his/her own experience along and establishes a new Anamnesegruppe.
2) someone hears of the groups and invites tutors of Anamnesegruppen to give a presentation at the university. The presentation may be the catalyst for setting up new groups.

Which conditions are necessary for establishing Anamnesegruppen?

You need:
i) members for the groups
ii) tutors
iii) patients
iv) rooms
v) supervision for the tutors

In points iii), iv), and v), support of the students by an institution, usually the university, and individual professors is also necessary. You thus need both: the initiative of the students and the support of professors and/or an institution for long-term success.
In the case of a presentation by external tutors, there are additional conditions:

1) the time: students normally haven't got much time besides their lectures for extra activities;
2) the foreign language which one must speak adequately; a new problem for us, and
3) finances for the trip, because students are not usually particularly wealthy. These were the basic conditions. Why did we choose Rennes?

For many years there has been an exhange program between the University of Erlangen and the Université de Rennes, including an annual exchange for medical students. In the 1987/88 term, A. Freitag, a tutor from Erlangen, had been in Rennes on an exchange. He noticed that in France there was no teaching program comparable with the Anamnesegruppen, where the patient is the focal point. His fellow French students were interested in becoming familiar with this teaching program. And thus the idea to introduce this teaching method in Rennes arose in cooperation with tutors from Erlangen.

Which preparations had to be made in Erlangen?

We first had to find at least one more tutor and additional experienced group members who were not only French-speaking, but who also had enough time for the trip. We therefore asked all the tutors, and asked them in turn to look for interested participants in their groups. We

planned the Whitsun week as a tentative date, since it meant the end of the summer term in Rennes and holidays in Erlangen. At the end of the winter term 1987/88 we had a group of two tutors and eight additional members for the trip.

Our intention for the program was not only to demonstrate the Anamnesegruppen, but also to integrate the French students as much as possible right from the beginning. We therefore got in contact with the French students on exchange in Erlangen. They were spontaneously enthusiastic about the idea of a presentation of the Anamnesegruppen in Rennes.

At a preparatory meeting we discussed the way we could introduce the Anamnesegruppen this time. Normally in Germany the presentation is done by working with a group of members from the new town who are directed by experienced tutors. But it is quite obvious that in Rennes the tutors would be confronted with an additional problem: the foreign language. We thus decided to have mixed French/German groups in variation of the original model, so that the groups would consist of two tutors, two German and four French members. We expected that with two additional German members the linguistic problem would be minimized, and furthermore, being experienced members, they would stimulate the discussion and support the mediation of the specific experience.

Meanwhile we had heard that during the Whitsun week students in Rennes would have to study for their examinations, so they would not have the time for a new program such as the Anamnesegruppen. Another possible date for us was the last week in April, which is the last week of our holidays. The disadvantage of this date was that some members of our group couldn't take part in the trip. But although our group would be smaller, we would still have enough members to undertake the journey.

The above-mentioned conditions of a specific date and knowledge of the foreign language had been taken care of. But what about the finances? In addition to some support provided by the students' association, we were able to get financial support from the university and the Bavarian Ministry of Science. As support for a student enterprise, this was exceptional.

You remember the conditions iii) to v) for the establishing of Anamnesegruppen. To get official support, A. Freitag and F. Donnars, a French student in Erlangen, got in contact with the Dean of the Medical Faculty and the professor for Medical Psychology. Both welcomed the idea and promised their support.

Later on the students in Rennes were informed about the planned presentation of Anamnesegruppen with posters, handbills and personal information, and were invited to a lecture with basic information on Anamnesegruppen. This lecture took place one week before our arrival.

After our arrival we met with the eight French students interested in Anamnesegruppen. We got to know one another and arranged the groups. With this number of interested students two groups could be established.

For the work with the groups we had expected difficulties in two ways: the language barrier and difficulties based on the different teaching systems in France and Germany. Regarding the language, the German members weren't able to take part in the discussion in the same differentiated way as they would have done in German, and they had to become accustomed to the faster way of talking. However, the French participants were able to deal with these difficulties and took pains not to overtax the Germans. The content of the discussion was thus not affected by the linguistic problems.

In terms of the different teaching systems, in Germany the education is almost entirely theoretical. This means that there are few chances for students to have contact with patients, and even more, that history-taking cannot be learned and trained. Therefore German students have two main motives to take part in an Anamnesegruppe:

1) most of the time it is the only possibility to train in history-taking
2) it is a possibility to come into contact with medicine and its psychosocial element.

Training of history-taking is not a motive in France. From the fourth year of their studies on, the students are trained daily in systematic history-taking.

When in their first reactions the French students told us that they already knew about history-taking and couldn't see anything new in the Anamnesegruppen, we became quite sceptical. We expected that in the group session, the French participants would perform a perfect somatized history-taking, and that later on they would be

very sceptical about the ideas that the Germans would bring into the discussion.

To have patients and rooms for the groups, Prof. Bourdiniere, Professor for ORL, could be captivated. He provided the possibility to have the groups in his clinic, despite being sceptical about the plan.

The meetings and further developments

At one meeting the interview ran according to our expectations, at the other quite the contrary happened. The interviewer thought that in an Anamnesegruppe only psychological facts had to be asked. He completely neglected the symptom-oriented scheme of history-taking he was used to.

In the final meeting with the participating students after the sessions, most of them showed interest in deepening their practical skills in the Anamnesegruppen. They were interested in taking part in a regular group in Rennes.

As requested by Professor Bourdiniere, we reported the results of the sessions to him. We knew much more about the psychosocial situation of the patients than he had expected. Obviously convinced by that, he saw the possibility to capture a lack of psychosocial education with the Anamnesegruppen. He and the professor for Medical Psychology offered their support for regular groups in the future.

After this positive start in Rennes, both French students on exchange in Erlangen took part in a group at our University. In addition, F. Donnars took part in a training session for Anamnesegruppen tutors. When they went back to France in 1988 again, former members of Anamnesegruppen were on exchange in Rennes. So together with a German tutor, F. Donnars could arrange a first regular Anamnesegruppe during the past term, and further groups are planned for the future. There will also be additional support for the groups by the exchange of students between Erlangen and Rennes.

One problem at the moment is the lack of supervision (point v), but we hope to solve this problem in the future. Another problem is that there are more examinations in France than in Germany. It seems to us that French students therefore have much less time for activities outside of their regular studies.

The experiment of exporting Anamnesegruppen to France seems to have been successful, and we expect that Anamnesegruppen in Rennes will grow prosperous in the future and be an enrichment to the curriculum.

Why did we choose this topic? At this conference, people who are interested in the medical curriculum have come together. Medicine which integrates biological and psychosocial aspects also needs teaching which integrates these aspects. Anamnsegruppen can build one brick in the wall. I hope that I could bring your attention as teachers or students to this teaching program. Although it is quite obvious that it takes some efforts to introduce Anamnesegruppen to a new university, it is not too difficult to have these groups at a new university. Anamnesegruppen are in fact a students' initiative, but nevertheless they need the support of teachers and the medical faculty, even if these groups already exist in your town.

SESSION III:

SCIENTIFIC THINKING IN MEDICAL EDUCATION - EVALUATIVE AND OTHER ASPECTS -

Chairmen: Prof. N.-H. Areskog (Sweden); Dr. O. Harlem (Norway)

Clinical Competence: Definition and Assessment

Prof. D. I. Newble (Australia)

Nine years ago, the AMEE Conference was held in Nijmegen. The theme of the conference was "Assessment of Competence in Undergraduate Medical Education". At this meeting I was invited to give two papers - one dealing with the definition of competence and one dealing with the evaluation of competence (Newble, 1981; Newble, 1981). It, therefore, seemed logical to review what I had to say at that time and see what changes had occurred between 1980 and 1989.

With regard to the definition of competence it is disappointing to report that very little new information has appeared over the last 10 years. In their book "Assessing Clinical Competence", Neufeld and Norman include a chapter reviewing the methods used to define competence. The book was published in 1985 yet the most recent reference they quoted relating to definition of competence was published in 1979 and many of the most pertinent were written in the 1960's and early 1970's. Perhaps one might conclude that the problem had been solved and that we have a valid definition of competence. However, this was not the opinion reached by Neufeld & Norman. They concluded that "No single method can adequately define the pre-requisite knowledge, skills and attitudes required of a competent physician" and that the methods used in the past all had limitations derived from bias or too narrow a focus.

The problem is, if we are going to approach the assessment of competence in a way which has any resemblance to the scientific method then we must have a detailed definition on which to base the development of our test procedures and against which we can judge their validity. The definition will determine the objectives of the assessment. The definition will also of necessity be complex and will be composed of a wide range of attributes.

One such definition, which in my view has not yet been improved upon, at least as one appropriate for undergraduate education, arose from a major critical incident study conducted by the NBME in the United States in the 1960's (Hubbard et al, 1965). This study produced a list of nine competence categories (History; Physical Examination; Tests & Procedures; Diagnostic Acumen; Treatment; Judgement and Skill in Implementing Care; Continuing Care; Physician/Patient Relation; Responsibilities as a Physician) each of which was broken down into subcategories. For instance if we took the category Physician/Patient Relation there are three sub-categories (Establishing rapport; Relieving tensions; Improving co-operation). Once again each of these was further divided to provide descriptive statements of the types of behaviour by which each subcategory would be recognised.

Assuming we have some definition of competence available to us when we set about designing our assessment, how are we going to approach detailed definition of content and the selection of test methods in a rational way? Unfortunately, there is often not a clear and logical link between these elements. Assessments are often related more directly to imperatives imposed by departments, disciplines or external agencies. Departments may, for example, lock themselves into using certain methods on the basis of tradition or expediency even though they may be inappropriate. In order to overcome this problem in our own university, Clinical Competence has now become a subject in its own right.

The model on which the approach we have adopted is based has been described elsewhere (Newble, Elmslie & Baxter, 1978). In essence, we link the selection and development of test methods through clinical problems. For each problem we produce a blueprint which identifies

the content we wish to test. The blueprint starts simply as a piece of paper listing the nine competence categories mentioned previously. For each of these subjects specialists are asked to list those key items which students should know or be able to do if they were to successfully deal with that particular problem at the level of competence expected of an intern.

So, for example, if we took the problem chest pain and looked at category three, Tests & Procedures, the key items would include aspects of electrocardiography, chest radiology, cardiac enzymes, coronary angiography and so on. Thus, we are using the defined categories as a check-list to ensure that the content on which we base the examination covers the full range of knowledge and skills over which we expect our students to be competent. It is on such a structured approach that we will have to rely if we are going to establish the content validity of our assessment and it is not possible to overemphasize the fundamental importance of content validity if we wish to produce a good test.

Perhaps I am overcomplicating things so let me try and develop a model which may simplify the message and at the same time introduce a couple of new concepts which need to be included in any discussion on the definition of competence. In recent years there has been a trend to restrict the term competence to the capacity or ability of the student or doctor to do something and seperate it conceptually from "performance" in practice. At its most simple, we might view competence as the mastery of both a body of relevant knowledge and a range of relevant skills (which would include clinical, interpersonal and technical skills). Knowledge and skills are, of course, interrelated but ultimately only useful if they are put to some purpose which we might call clinical problem-solving. Finally, it is probably wise to indicate in our model that competence is only a prerequisite to performance in the real clinical world. Unfortunately, we know from studies in the quality assurance area that competence does not always correlate very highly with performance in practice.

On the basis of such studies, we might argue quite persuasively that clinical assessment should only be based on measures of performance or outcome of patient care rather than on measures of competence. This is certainly a valid argument in the postgraduate period where doctors have direct responsibility for patient care. However, such opportunities are limited in the undergraduate period where we have no option but to look predominantly at competence. This is, perhaps, fortunate as measuring the outcomes of patient care is notoriously difficult.

However we decide to define competence, when it comes to assessing it we must have some kind of matrix which allows us to match the categories of competence with the test methods available. We must, as I have mentioned previously, sample across the full range of problems with which the student must deal. To do this effectively it is necessary for those responsible for assessment to have an understanding of the strengths and weaknesses of the available test methods. Some help is available in this regard. The two best resources are Neufeld & Norman's book and the report of the 1st Cambridge Conference which is entitled "Directions in Clinical Assessment" (Wakeford, 1985). Table 1 is taken from this report and gives a consensus view on the relative merits of various test methods for assessing the different components of competence. Other useful resources are the proceedings of the first two Ottawa Conferences (Hart, Warden & Walton, 1985; Hart & Harden, 1987) and, in due course, those from the third conference held recently in Groningen.

TABLE 1

Recommendations on the use of evaluation methods to access domains of competence

\+ = of some use +++ = of most use

Competence/skill	Method								
	Global Ratings	MCQ	MEQ	PMP	"Cambridge Case"	Standar-dised Patient	Patient Rating	Direkt Obser-vation	Mechanical simulation
1. Knowledge		++	++	+		+		+	
2. Interviewing/ Interpersonal						++	++	++	
3. Data gathering, History			+	+	+++	+++		++	
4. Physical Exam. (Technical)						+++		+	+
5. Reasoning/ Diagnosis		+	+	+	++	+		+	
6. Lab Utilis./ Management		+	+	+	++				
7. Personal Qualities	++								

From Directions in Clinical Assessment (1985) Wakeford (Ed)

TABLE 2

Projected reliabilities at various test lengths (estimated from pooled 1983-86 data). All entries in the table are generalizability coefficients (intraclass correlations) including inter-item/station and interrater (for patient stations) sources of measurement error, but excluding item/station difficulty. Italicized entries indicate the reliability at the test length actually used in the 1985 and 1986 test administrations. Estimated variance components on which reliability calculations were based are available from the second author.

Test length (hours)	MCQ in medicine	Short answer	Patient stations*	Static stations	Clinical test*
0.5	0.62	0.42	***0.31***	0.23	0.32
1.0	***0.76***	0.59	0.47	***0.38***	0.48
1.5	0.83	***0.68***	0.57	0.47	0.58
2.0	0.87	0.74	0.64	0.55	0.65
3.0	0.91	0.81	0.73	0.64	***0.73***
4.0	0.93	0.85	0.78	0.71	0.79
6.0	0.95	0.90	0.84	0.78	0.85
8.0	0.96	0.92	0.87	0.83	0.88
Items/stations per hour	75	44	10	10	22/5

* Two raters per patient station.
(Taken from Newble & Swanson, 1988)

To help us move from the rather theoretical approach I have taken so far to a more practical viewpoint, I want to discuss briefly some of the work we have been doing at the University of Adelaide over the last 10 years or so (Newble, 1988). This is simply to provide a case study which will illustrate some of the problems one faces when trying to translate educational theory into practice.

As I mentioned previously we administer a test of clinical competence to all students of the end of the final year. This test is run jointly by the Departments of Medicine, Surgery, Paediatrics and Obstetrics & Gynaecology. It is composed of two equal components of 90 minutes. One is a test of relevant knowledge composed of short answer questions. The other is a structured clinical examination of 15 stations.

Over several years this examination has been subject to a rigorous psychometric analysis by my colleague David Swanson from the NBME in Philadelphia (Newble & Swanson, 1988). As with any critical evaluation the results were not always as we had expected, nor were the messages always the ones we wanted to hear. However, this is the nature of research. Though time precludes any detailed discussion of this work let me highlight a few issues.

We were, of course, interested in providing evidence for the reliability and validity of the examination. I have given you some information about our approach to content validity and I could provide a little evidence on its construct validity (Newble, Hoare & Elmslie, 1981). However, I will restrict my remarks to the issue of reliability.

In table 2, you can see real (&INI.) and projected reliabilities obtained or estimated from pooled data collected over a 4 year period. The estimates come from a statistical approach based on generalisability theory. A clear understanding of the importance of this information can best be obtained by reading the paper from which it is taken (Newble & Swanson, 1988). Nevertheless, you can appreciate the very low reliabilities for most components of the examination except for the written components. The projected reliabilities allow us to estimate how much more testing time would be required for each subsection of the test to achieve satisfactory reliability. The only comfort we can draw from this study is that the reliability for the overall clinical test is acceptable.

We might now ask: What is the reason for the low reliabilities of the clinical components of the test? Traditionally, of course, the main concern with clinical examinations has been with rater reliability. However, in this stuctured clinical examination this does not appear to be the major factor. Average inter-rater reliability works out to be about 0.7. This is about the same as has been found in a number of other studies using a similar approach (van der Vleuten & Swanson, 1989).

The real problem emerges when we look at interstation correlations. They are very low being of the order of only 0.1. There is thus considerably more variance in performance of candidates between stations than there is between marks awarded by raters. This is not an inherent problem with the technique we are using or an Australian aberration but a problem which seems to affect <u>all</u> methods used to assess clinical skills and clinical problem solving.

Clearly there must be a common problem in all these situations and this appears to be "case specificity". This simply means that the performance of a candidate in one clinical situation is not a very good predictor of performance in another clinical situation. Of course, this is not surprising when we take into account recent research into clinical problem solving. We now know that the quality of problem-solving is determined more by specific knowledge and experience with each particular problem than it is by any general problem-solving skill (Norman, 1988).

The difficulty we find ourselves in is that most forms of clinical assessment are based on a very limited number of observations. In the traditional clinical examination used in many parts of the world for assessing students and postgraduates, decisions may be made on the basis of performance on one long case and a handful of short cases. This is clearly an inadequate sample of performance: the evidence is available to prove it, yet such examinations are still widely used. We have to face up to the uncomfortable fact that to achieve a valid and reliable assessment of competence we will have to sample from a large number of clinical problems and across the full range of competence categories. We will also need to use a number of test methods, selecting those which provide the most valid measure of the component of competence we are testing. The selection of methods will also

need to take into account efficiency as well as efficacy given that we now know that testing time is an important practical issue.

The implications of having to use 4-8 hours of testing time to achieve a reliable assessment of clinical competence are mind boggling to many. Fortunately there are a few interesting new ideas which might relieve some of the strain. For example, if the number of raters is a limiting factor, little reliability is lost by using one rater instead of two whereas much is gained by an increase in the number of stations. Again, if the main purpose of the assessment is to make pass/fail decisions and the majority of the candidates are expected to succeed, a considerable saving in resources could be achieved by sequential testing. Such an approach envisages the use of a short, less reliable test to quite fairly screen out (ie pass) say 70% of the candidates. A different or longer test would then be used to make more accurate decisions on the 30% of students closest to the pass/fail decision point. The same students would eventually pass but less resources would have been required.

Returning to Nijmegen, I am somewhat embarrassed by the naivity of my presentation nine years ago on the assessment of competence. At this time we had very little data on the new approaches to assessing competence which were being advocated as the answer to the reliability and validity problems posed by traditional methods. The major achievement of the last few years, in my view, has been a more critical analysis of what we are doing. It has always been difficult for me to understand why many of my colleagues, who demand such a high standard of the tests they use in their research laboratories or for decision making on their patients, do not insist on the same quality of the tests used to make equally important decisions on their students. Educational tests are often of a low standard but escape criticism.

I therefore, applaud the organisers of this conference for choosing the theme "Scientific Thinking in Medical Education". While the main concern seems to have been with the importance of teaching students how to think scientifically, equally important, in my view, is a need to get teachers to apply the process of scientific thinking to the educational methods we use and particularly to the vital area of student assessment.

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How to Evaluate Scientific Thinking in Medical Education

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To propose how to **evaluate** scientific thinking presupposes to know **what kind of science** future physicians will need. It is safe to assume, however, that different modes of scientific thinking than the ones inocculated by today's medical education will be required (if scientific thinking is inocculated at all). Thus, before engaging into the topic of evaluation proper one has to find some answers to the what-kind-of-questions, which can be enlarged to the question of what kind of scientists should be enabled to deal with what kind of health priority. This will lead to the more technical question as to what kind of data should be collected to evaluate scientific thinking in medicine.

In an attempt to reduce the complexity of the what-kind-of-question, two essential kinds of scientific problems and - in consequence - of evaluation data will be described. These two kinds represent somehow an overstatement; reality is much less black and white.

What kind of scientist

Medicine obviously needs practitioners, practitioners of health care delivery and practitioners of medical research. For both one can envisage two modes of scientific competence:

1. Practitioners able to reproduce the stories of human sciences, researchers able to multiply already accomplished or ongoing projects.

2. Inquisitive human science workers.

The first individual is in the possession of knowledge which has been transferred to him or her. This is in line with the sad tradition of a majority of educational systems. On the one hand, practitioners are vocationally trained. On the other hand, they have at their disposition some textbooks, prescription books and the dangerously overfilled storages of their memories. They could be described as craftsmen equiped with a scientific encyclopedia.

For this kind of clinician, a patient with epigastric pain occuring two hours after meals, relieved by food or antacids, is someone who needs an endoscopic examination of the upper gastrointestinal tract. Under consideration of the findings there is a choice or combination of medical, dietetic or surgical treatments; it is all in the textbooks. Or, if this clinician feeds these and some additional findings into a well-programmed computer, he or she will exactly be told what to do.

This type of person will not only be found among practitioners delivering health care but among research workers as well. In most instances, what is loosely called research, is no more than the application of stored knowledge.

Drug trials may serve as an example. There are excellent textbooks - one might call them prescription books - describing exactly how to organize, apply and evaluate the double blind study design. Or, a research worker's predecessors in the same institution have probably done the same thing ..., all of it can be reproduced.

Thomas Kuhn (1) has called this "normal science". Normal here also means being satisfied with non-obstrusive, conformist knowledge, in keeping with the rules and regulations of the established research communities.

The second individual, the inquisitive worker, is much more difficult to describe. It is not implied that this type of research worker will reinvent the sciences. To quote the educator Paolo Freire (2), this type of person has "rewritten" what he or she has read. Such a person will then have the tendency to see the object of his or her scientific interest in a wider context than the one traditionally established in a given discipline or speciality.

As a clinican confronted with the same patient suffering from epigastric pain, she or he might be primarily interested in the personality and the situation of the patient, in his very subjective concerns and perspectives, his way of life and his reason to seek help here and now ..., although this second person might have exactly the same knowledge about the nosology, pathophysiology, management and prognosis of peptic ulcer.

The problem to be solved for the first individual is a physiclogical/biochemical/morphological disturbance: Autonomous nervous imbalance, endogenous production of gastrin, secretion of hydrochloric acid and of pepsin, breakdown of the mucosal resistance, ulceration. In the second case one deals with an unknown person in an unknown situation, a psychosocialneuroendocrinological constellation connected with the before-mentioned physio-chemical peculiarities, which can be considered as the tip of the iceberg. One hundred years ago, the first view must have presented much more of a scientific aspect than

it does today. By the accumulation of scientific knowledge, a problem to be solved has become a task to be accomplished.

An analogous research situation is concerned with unknown and unexplained situations. The way to set up the research process is not described in any prescription book.

There was no intention to denigrate the first standardized situation in any way. Everybody has to deal with such situations during most of one's professional activity. However, it should be stressed here that this does not involve scientific thinking. Thus, scientific thinking cannot be evaluated.

The difference between the two situations somehow coincides with Erich Fromm's categories of having and being. The Western society is overconcerned with consuming and possessing and knowledge makes no exception. Consuming knowledge in order to own it is the biggest obstacle preventing the development of scientific thinking. Another difference could be seen in the fact that reproductive scientific work tends to be analytic or reductionist: It originates as a given phenomenon or situation which then is dissected according to a known procedure. Imaginative and inquisitive scientific work more often deals with a context, which covers more than the primarily perceived problem situation.

Scientists and practitioners able to reproduce or to multiply will be comfortable with one or several out of the list of the subjects which make up a traditional medical curriculum. This list ranges from biochemistry, anatomy and physiology over some forty items to cardiology, orthopedics, psychiatry and the like. It is obviously impossible to attain competence in one or any number of these subjects in the course of basic education. For this reason the support of scientific creativity has been replaced by the provision of stories out of these numerous scientific subjects. At the level of evaluation one is then left to search in the students' memories for some fragments of these stories. It becomes evident that the question "what kind of science?" must be preceded by the question "science for what kind of health priority?"

Health priorities

Maintaining health in the face of

- war
- maldistribution of resources
- diesintegration of families
- stress at work/unemployment
- environmental threats
  - polution of air, water and
  - soil traffic
- addiction, consumerism

Restoring/improving health in

- old age
- prenatal/adolescent disorders
- mental/social disorders
- degenerative disorders
  - cardiovascular
  - musculosceletal
- (tropical) infectious disorders
- acute organ failure and injuries

Fig. 1

In trying to look into the future of the medical profession, one should put "maintaining health" in the first position and "restoring and improving health" in the second. By listing the major situations connected with health and with the major disorders of health characteristics for this society one specifies the field for which students have to be prepared, in this case concerning the scientific level. The question, whether and to what extent a medical student has to be engaged in molecular biology or psychoanalysis, depends on the priorities encountered in today's circumstances of health and health disorders (Fig. 1). If there is no such requirement, one should happily drop these subjects from any medical curricular make-up. One should break with the misfortunate tradition to define educational goals on the basis of subjects. Subjects are artificial constructs emerging more from the evolution of the health professions than from the panorama of health and health disorders.

On the basis of these preconditions one finally arrives at the technical questions of evaluation:

What kind of evaluation data to collect

The choice of categories of data is quite limited:

- scores of multiple-choice tests
- scores of essays and interviews
- observation and analysis of clinical and scientific work

Still, a world of difference separates the two extremes: clean numerical figures at the top, descriptive and qualitative statements at the bottom. The benefit of objectivity or assumed objectivity shines on the one side and the ghost of subjectivity lurks on the other. However, one obviously cannot get through the clean objective way in the case of scientific thinking; it is too complex a process to be reduced to multiple choices. One should not overlook the trivial fact that the evaluation of scientific thinking can only take place if scientific thinking is included in the process of learning. Unfortunately, this doesn't usually take place. It takes place during the interaction in problem-based tutorials, in which scientific instruments are needed to get at solutions, i.e. when problems are put in a sufficiently wide context to imply the use of scientific methods.

Since the introduction of the McMaster University MD-programme in Hamilton, Canada, such sessions have become components of an increasing number of undergraduate medical curricula. It is obvious that informal and highly relevant evaluation is going on in these tutorials. An education consisting of a representative sample of problems to be solved could cover all the essential scientific domains needed in practice and research. However such informal evaluation does not necessarily cover the need for the legitimization and the documentation of the competences attained.

A comprehensive evaluation of medical clinical competence	**Time schedule**	
1. Collection of data by candidate - interview - physical examination - requesting investigations	candidate 45 min.	observers 45 min.
.... and review of additional information	2 hrs.	
2. Orientation/Information of patient by candidate	10 min.	10 min.
3. Presentation of case by candidate to the observers	15 min.	15 min.
4. Consultation of experts by candidate	10 min.	10 min.
5. Questioning of candidate by observers	10 min.	10 min.
6. Self-assessment of performance by candidate	10 min.	10 min.
7. Preliminary assessment of clinical performance by observers and information of candidate	(15 min.)	15 min.
8. Formulation of questions concerning scientific aspects of case	10 min.	10 min.
9. Preparation of scientific essay (homework)	2-5 days	(.....)
10. Presentation of scientific essay and of theses. Assessment SMACT (Scientific Method and Critical Thinking)	45 min.	45 min.
11. Evaluation and decision	(15 min.)	15 min.
Total:	5 hrs. + n days of praparatory work	3 hrs. 5 min. + preparatory work

Fig. 2

For this reason, a model evaluative procedure is presented in Fig. 2, which might allow to somewhat formalize the observation of scientific thinking and reasoning in the context of an overall assessment of clinical competence. Elements of such a model have been tested under several circumstances (3). It consists of the observation of all phases of clinical work (points 1-7), followed by the elaboration and the work-up of a scientific aspect of this case. Considerable time and effort will have to be invested in such a procedure. However, it might be worthwhile to consider this type of assessment at the expense of much of the evaluation procedures emphasizing recall of factual knowledge which traditionally accompany medical curricula. Moreover, it should be emphasized again that even such a complex but formal setting is second choice, a concession in order to legitimize formal decisions for promotion and licensure by distinct procedures which can be standardized to a certain extent. The main effort should go into making the learning process and its results more transparent and into integrating it with scientific thinking on the one hand and professional services on the other.

In summary one can conclude that scientific thinking has to be evaluated in the broad context of problem solving, which goes beyond the confines of disciplinary and reductionist scientific tradition. Those responsible for it have therefore to transgress the limits of their own more or less specialized subject. In addition, this type of evaluation involves time consuming engagement and observation. If this effort is not made, one will never know whether and how scientific thinking is taking place in those who are prepared for the medical profession, which in part is a scientific one.

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SESSION IV:

PARALLEL STUDY GROUPS FOR FREE PRESENTATIONS AND AMEE STANDING GROUPS

1. RESEARCH IN MEDICAL EDUCATION (free topics) I

Chairmen: Prof. J.-F. d'Ivernois (France); Prof. W. Tysarowski (Poland)

Evaluation of the Reasons for Sick Leave Given to Students at Çukurova University

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The medical problems of the university students in Turkey are handled at the medico-social centers of each university. The administrative committee of the faculties evaluate the seriousness of students' health problems according to the sick leave given by the university hospitals and the authorized commissions.

In this study, the sick leave given to the students of the three faculties of the Çukurova University (namely the faculties of medicine, agriculture and administrative sciences) have been analysed. The purpose here was to evaluate the main health problems with respect to faculties which the students attend. Comparisons between faculties have been made especially with reference to the students of the faculty of medicine. The main parameters taken into consideration were the rate of health disorders per faculty, the diagnosis and the duration of the sick leave.

MATERIALS AND METHODS

The study is a retrospective one made utilizing the sick leaves taken by the students of three faculties of the Çukurova University between the academic years of 1985 and 1989. The faculties are those of medicine (first four years), agriculture and administrative sciences. The sick leaves were analysed with respect to faculties, sex and class of students and the departments the sick leave is taken from.

RESULTS

Table 1. Number of Sick Leaves between 1985 and 1989

	No. of Sick leaves	%	Total No. Students
Medicine	43	14	6601
Agriculture	243	76	7660
Administrative Sciences	31	10	6050
Total	317	100	20311

The ratio of students of the Faculty of Agriculture who take sick leaves is significantly higher than those of the other two faculties ($p < 0.01$)

Table 2. Total and Average Number of Days of Sick Leave with Respect to Faculties

	No. of Sick leaves	Total no. of days	Average no. of days per sick leave	Mode
Medicine	43	551	12.8	7 days
Agriculture	243	7953	32.7	15 days
Administrative Sciences	31	556	17.9	15 days
Total	317	9060	28.6	15 days

The students of the Faculty of Agriculture appear to take longer sick leaves than those of the other two faculties.

Table 3. Sex Distribution of the Students With Respect to Faculties Attended

	Male		Female		Total
	n	%	n	%	
Medicine	33	77	10	23	43
Agriculture	172	71	71	29	243
Administrative Sciences	20	65	11	35	31
Total	225	71	92	29	317

$X^2 = 1.15$, $p > 0.05$

No significant difference in sex ratios within faculties ($p > 0.05$).

Table 4. Treatment type With Respect to Faculties

	Hospitalized		Out Patient		Total
	n	%	n	%	
Medicine	13	30	30	70	43
Agriculture	59	24	184	76	243
Administrative Sciences	9	29	22	71	31
Total	81	26	236	74	317

$X^2 = 0.85$, $p > 0.05$

No significant difference within faculties in treatment types leading to sick leaves ($p > 0.05$).

Table 5. Distribution With Respect to Department Leading to Sick Leaves

	Surgical depts.		Non-Surgical depts.		Emergency depts.		Total
	n	%	n	%	n	%	
Medicine	10	23	32	75	1	2	43
Agriculture	126	41	100	52	17	7	243
Administrative Sciences	18	39	12	58	1	3	31
Total	154	49	144	45	19	6	317

$X^2 = 18.31$, $p < 0.01$

Medical students resort to sick leave from non-surgical departments more frequently than from others ($p < 0.01$).

Table 6. Sick Leaves from the Psychiatry Department With Respect to Faculties.

	Psychiatry		Others		Total
	n	%	n	%	
Medicine	20	47	23	53	43
Agriculture	37	15	206	85	243
Administrative Sciences	7	23	24	77	31
Total	64	20	253	80	317

$X^2 = 22.72$, $p < 0.001$

Number of sick leaves from the psychiatry department are significantly higher for medical students ($P < 0.001$).

Table 7. Distribution of Sick Leaves from the Psychiatry Department with Respect to Year of Education.

	1st year	2nd year	3rd year	4th year	Total
Medicine	1	12	6	1	20
Agriculture	7	13	10	7	37
Administrative Sciences	-	2	2	3	7
Total	8	27	18	11	64

$X^2 = 3.27$, $p > 0.05$

The distribution of sick leaves from the psychiatry department does not show any significant features with respect to the year of education. However, when a comparison was made within the faculties, students of 2nd and 3rd year medicine take more sick leaves from the psychiatry department compared with the other classes of this faculty ($X^2 = 16.4$, $p < 0.001$).

CONCLUSIONS

1. Medical students resort to sick leave from non-surgical departments more frequently than from others.
2. The number of sick leaves from the psychiatry department is significantly higher for medical students.
3. The ratio of students who take sick leave per faculty is the highest for the faculty of agriculture.

4. The students of the faculty of agriculture take longer sick leaves.

5. Sex distribution and treatment type do not differ with respect to faculties attended.

6. When the analysis of the distribution of sick leaves from the psychiatry department is made within the classes of the faculty of medicine, it can be seen that the 2nd and 3rd year students are subject to sick leave of this type more frequently than 1st and 4th year students. This finding may be due to the intensive educational program in the premedical period and/or to the overloaded theoretical curriculum in the 2nd and 3rd years of the faculty of medicine. This, we believe, emphasizes the importance of the psychiatric test for the students selection and psychiatric counselling in medical schools.

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Research on the Logical Structure of Medical Knowledge as Related to Medical Teaching

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(Abstract)

The volume of medical knowledge and the level of expertise necessary for effective solving of medical problems have been growing dramatically in recent years, and it is evident that this trend will not only continue but even accelerate in the future. The effectiveness of teaching decreases and in order to maintain it (avoiding at the same time excessive specialization), reorganisation of the components of the undergraduate curriculum and postgraduate studies, introduction of new disciplines, and taking into account more and more details does not suffice; these measures may even make the situation worse. The solution should be sought in perfecting the methods of teaching and learning, and - probably most important - in providing (whenever it is possible) the student with a strong background of general knowledge and versatile thinking. The goal of the development and perfecting of the process of medical education should consist in teaching and assisting learning of broad concepts, general laws, basic structures and processes, correct procedures of reasoning and effective methods of practical problem solving; the detailed knowledge and its practical application should follow as a natural extension and broadening of a general basis or basic domains, the number of which may be restricted. Despite the fact that the realisation of the above postulates does not necessitate any essential restructuring of the curriculum but rather the shifting of emphasis from details to generalities, the present state of advancement of medical knowledge could allow it only partially. The growth of empirical aspects of almost every medical discipline should be accompanied by a parallel progress in general methodology and understanding which is a necessary condition for the above-stipulated change of perspective in teaching.

This paper presents the results of a study of basic logical problems of medicine which are especially relevant from the educational point of view, as well as suggestions concerning their use in teaching. The research in this field is conducted in our Center and is partly related to the use of computers as tools assisting medical teaching and decision making. It is centred on the following problems: a) medical concepts: their denotation and connotation, and structure of laws and fragments of knowledge; b) main procedures of reasoning: inference, verification of hypotheses, explanation, proving; c) description of the basic physiological and pathological processes (e.g. regulation, disease): its logical structure; d) general aspects of the basic medical actions (e.g. diagnosis, therapy); e) logical principles of medical decision making. The implications of the above studies for the contents and organisation of medical textbooks, lectures, seminars, self-learning, etc. as well as for the use of teaching-aiding devices (e.g. computers) are briefly indicated. The use in education of the results of the logical analysis of medical knowledge and action is discussed also from the point of view of the relation of this approach to the main types of medical curricula, e.g. discipline-based and problem-oriented ones. The relevance for medical education of logical versus heuristic approaches is considered.

Retrospective Analysis of Thirteen Years of Admission Interview Data at Ben Gurion University Medical School

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(Abstract)

Semi-structured admission interviews have been employed at the Ben Gurion University Medical School (BGUMS) since its establishment in 1974.

The sum of two independent interview ratings serves as the dominant criterion tool of selection once an aptitude test and minimum matriculation requirements are met. This is a report of retrospective analysis of data from thirteen years of this admission process. Data of 612 admitted students and 110 interviewers were analysed.

The predictive validity and discriminative power of the interview ratings as to academic performance and global ratings during the various stages of the undergraduate studies was assessed. The results do not indicate that correlation exists between these parameters.

The admission interview is also nonpredictive of students failing academically or dropping out of school. Similarly, matriculation grades and aptitude tests were nonpredictive of undergraduate performance (of the selected students). Only 10% of individual interviewer ratings demonstrated medium to high positive correlations to students' achievements. Reliability between two interviews showed fluctuations of the correlation coefficients without a consistent trend with a median of 0.23.

Agreement between two interviewers in the first interview was significantly lower than that of the second. (mean $r = 0.33$; $SD = 0.32$ and mean $r = 4.8$; $SD = 64$ respectively.)

Although there is a general satisfaction from BGU graduates and the interview method is considered to play a role in the overall outcome, the findings of our analysis cannot substantiate evidence for the value granted to this method which is time-consuming and costly. Refinement by better selection and training of interviewers as well as reconsideration of the admission policy in general is suggested.

The Influence of Exposure to Clinical Knowledge in the Basic Clinical Science Subjects

René Krebs, Institut für Ausbildungs- und Examensforschung (IAE),
University of Bern, Switzerland

(Abstract)

Basic clinical science subjects are traditionally examined after the third year course of the Swiss medical curriculum. Students who took this examination at the end of the fourth year, in which they were involved in practical, clinical work, clearly performed better than their third-year colleagues who wrote it immediately after taking the required courses. This shows the positive impact of the exposure to clinical problems on the acquisition of knowledge in the basic clinical courses.

Giving Up Rates of Medical Students in West-Germany

Eberhard Göbel (Dr. rer. pol.), Udo Schagen (Dr. med.),
Institut für Geschichte der Medizin, Freie Universität,
Berlin, FRG

(Abstract)

Since the reform of 1970, medical education in West-German universities takes a minimum of six years. In educational statistics, there is no certain information about giving up rates. There are only estimates and research on that rate published by the German institute for organizing the nation-wide examinations (MCQ) for all medical students (Mainzer Institut für medizinische und pharmazeutische Prüfungsfragen). Those rates include only students who failed the same examination three times.

Other forms of giving up the medical course are not taken into consideration. In the form of two longitudinal studies we have registered the duration of medical education as well as the rate of German students who gave up their medical studies at the Free University of Berlin.

Our sample includes all age groups between 1973 and 1975, and 1976 to 1980. We have tried to reconstruct the course of any single student (of course anonymously). We can give some facts and figures concerning the special conditions of success and failure.

Concept Learning in Medicine

Prof. Wieslaw Tysarowski, Medical Academy, Warsaw, Poland

(Abstract)

Scientific thinking development during medical education calls for the elaboration of the theory of medical learning. Two main aspects are: a) the mental processes being developed during this period and b) the structure of knowledge which is used for learning. It is dealt with the second aspect only as related to medical epistemology - the theory of medical knowledge. The psychology of human learning in medicine has been very thin on ideas about what happens to scientific thinking during the whole period of medical learning.

We have constructed two medical concepts: respiration and diabetes, and corresponding to this structure, the two MCQ tests. It has been shown that structuring knowledge in the form of a "concept" helps both the acquisition of cognitive skills and its retention in the long-term memory.

It is concluded that the concept approach in medical learning is a step forward in the understanding of what happens during all periods of medical education.

2. RESEARCH IN MEDICAL EDUCATION (free topics) II
Chairmen: Prof. I. Forgacs (Hungary); Prof. J. Moll (Netherlands)

Strategy for faculty wide introduction of computer aided instruction in medical education

Th.J. ten Cate*, J. Heijlman**, J.D. Donnison*, P.R.A. Wijngaard**

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** Vrije Universiteit, Dept. of Medical Education, Amsterdam, The Netherlands.

Summary

The rapid technical development of CAI techniques and software are not parallelled by usage in everyday medical education. Reasons for this lag between possibilities and practical implementation are not only a lack of facilities, but more importantly, a lack of acquaintance and experience with CAI among faculty members. Furthermore, a substantial financial initial stimulus is a prerequisite for the adequate introduction of CAI. A model will be presented of faculty wide policy for the introduction of CAI, which has currently been implemented as a joint venture in both medical schools in Amsterdam. This four year project, started in 1988, will be described. The project aims at a rapid introduction of CAI in educational programs of all clinical and preclinical departments as well as at the increase of knowledge of CAI techniques among faculty members.

1. Increasing possibilities of CAI

The technical and educational possibilities of computer assisted instruction in medicine are rapidly growing. Available hardware and software facilities are constantly extending. A recent overview by Claydon and Wilson (1988) of computer assisted learning methods in medical education mentions the availability of four program types which can assist student learning:

A. Instructional programs

These consist of drill and practice programs and tutorial programs.

B. Relevatory programs

Relevatory programs invite students to discover the characteristics of a static simulation of reality (such as simulation programs).

C. Conjectural programs

These programs invite students to manipulate a simulation of reality (such as biomedical models).

D. Emancipatory programs

These programs have been added to the list, although strictly speaking, this is not computer assisted introduction. Emancipatory software can rather be regarded as a tool: text processing, statistical analysis, databases, spreadsheets, etc.

Recent technical developments have extended the possibilities of these programs, such as visual facilities, the development of authoring systems to facilitate the production of courseware, the increasing memory power of the hardware, etc. Despite the definite advantages and revolutionary possibilities of CAI, this educational innovation has not yet substantially been introduced into everyday medical education. A recent British survey by Florey (1988) reveals that in 20 medical schools which returned the survey questionnaire, the number of programmes used per school varied from 1 to 23; more than 80%

were locally written. The majority were developed by preclinical staff. Only 3 schools had a fulltime CAI-assistant. A Dutch national survey published in 1988 (De Jong, Pilot and Van Andel, 1988) lists 63 programs used in medical schools and other health care schools. Although we believe that these figures may be an underestimation of the number of programs currently available in medical education, the factual usage of many of these programs as a regular part of the curriculum seems to be even far less than these figures suggest. What might be the causes for such a slow penetration of CAI in medical schools? We believe the following factors contribute to this (cf. Bremer, 1986):

i) **Budgetary limits**:
To incorporate programs in the curriculum, a school must have enough hardware facilities. These are often not available in a satisfactory number.

ii) **Poor acquaintance of teachers with CAI**:
Teachers who are not acquainted with CAI techniques and programs in their field of speciality will not use them in their courses.

iii) **Lack of time to explore CAI possibilities and develop programs**:
Even interested staff members do not have the time to explore the possibilities of CAI in their field, let alone to develop programs.

iv) **Lack of schooled personnel**:
Few schools have professionals in computer assisted medical education to assist departments in acquiring courseware.

v) **Resistance to changes in the curriculum**:
A serious introduction of CAI (ie. not on a voluntary basis) requires a change in the curriculum.

vi) **Hesitation to use CAI programs that have been developed elsewhere**:
For some reason teachers often seem very critical about programs that were made by others, even by colleagues in the same specialty. Translation of programs that are developed abroad is rare.

vii) **Lack of a central strategy for the incorporation of CAI**:
Without a central policy, the introduction of CAI depends on individual computer freaks among staff members, which leads to inefficient use of diverse hardware, authoring systems, resulting in duplication of effort, development of already existing programs, etc.

2. Strategy employed by the Medical Schools in Amsterdam

For a number of years, the medical schools of both universities in Amsterdam have, independently, been allocating some central staff personnel to assist departments in their efforts in the field of CAI. However, in both schools this marginal investment did not seem to result in sufficient involvement of the faculty in CAI. Therefore in 1988 a joint venture between both medical schools was designed to execute a large, four-year project with the following characteristics:

A. **Aim of the four-year project**:

A.1. Acquaintance of staff members of all departments of both medical schools with some form of CAI in their own field.

A.2. In every department a number of operational medical CAI programs should be available.

A.3. Minimum basic knowledge in all departments required for independent further development of CAI programs.

A.4. A substantial contribution of CAI in both curricula.

B. **Ways in which the aim is to be reached**:

B.1. Temporary increase of the number of CAI personnel is realized.

B.2. Each department executes at least one CAI development project within the four-year period.

B.3. Each department receives during for at least one half-year one half-time equivalent of extra CAI assistance.

B.4. Within each department at least one staff member devotes time to CAI development.

B.5. Development is done primarily by producing courseware with an advanced authoring system.

B.6. If posible, programs are developed in a joint venture with the parallel department of the other medical school in Amsterdam.

B.7. All CAI programs developed within the

project are freely available to the other medical school in Amsterdam.

B.8. Short, practical courses and instruction are given about authoring languages, etc.

B.9. Hardware facilities are gradually extended as programs are implemented in the curriculum.

C. **Sources of CAI personnel in fulltime equivalents:**

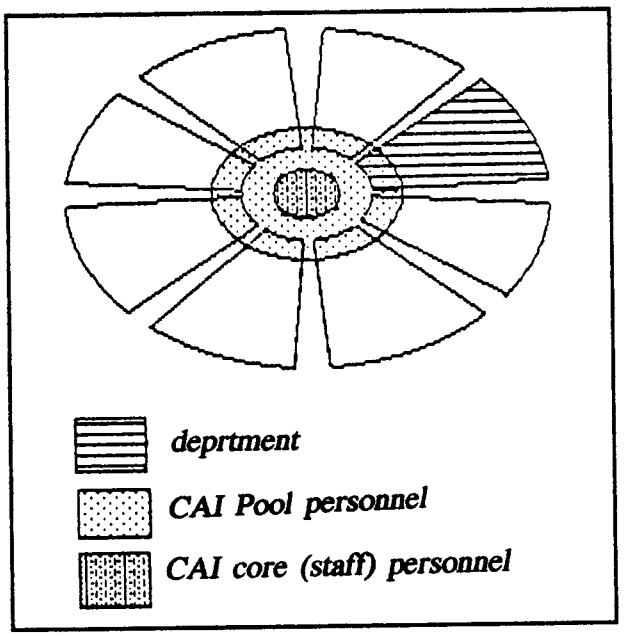
The plans were submitted to both university boards, which generously supported the initiative by offering the requested extra temporary personnel. In the following table the available humanpower is summarized.

	Universiteit van Amsterdam		Vrije Universiteit		
	faculty resources	university fund	faculty resources	university fund	total
1987	2	-	1	-	3.0
1988	2	2.9	1	2.9	8.8
1989	3	3.0	1	3.0	10.0
1990	3	(3.0)	1	(3.0)	10.0
1991*	3	(3.0)	1	(3.0)	10.0
1992*	3	-	3	-	6.0

*) not yet guaranteed.

D. **Distribution of CAI personnel:**

The allocation of available personnel has been divided: (a) the core of CAI (staff) personnel in both schools consists of medical CAI experts, and technical and administrative personnel a pool, (b) of CAI personnel consists in both schools of temporary medical CAI experts or staff members of (pre)clinical departments, compensated for CAI development work. The next picture shows a visual representation of the project organisation. As can be seen, at least part of the pool personnel works within the departments. This may be even realized by appointing department staff within the CAI group. This is done to realize the goal of increasing the department expertise of CAI.



3. Impression of the results of the project halfway through

The next table shows a condensed impression of the results of the project to date (September 1989). The available space for this paper does not allow a detailed description of the programs. Separate reports of the individual projects will be published elsewhere.

Departments with operational CAI programs in both Medical Schools in Amsterdam

U= U. v. Amsterdam V= Vrije Univers. **Departments** (25)	1986		1987		1988		1989		1990 (planned)	
	U	V	U	V	U	V	U	V	U	V
Anaesthesiology	-	-	-	-	-	-	-	-	-	-
Anatomy	-	-	-	-	-	+	+	+	+	+
Biochemistry	-	-	-	-	-	-	+	-	+	-
Cardiology	-	-	-	-	-	-	-	-	-	-
Cell Biology	-	-	-	-	-	+	+	+	+	+
Dermatology	-	-	-	-	-	-	-	-	+	-
ENT	+	-	+	-	+	-	+	-	+	-
Pharmacology	-	-	+	-	+	-	+	-	+	-
Physics	+	-	+	-	+	-	+	-	+	+
Physiology	+	-	+	-	+	-	+	+	+	+
General Practice	-	-	-	+	-	+	+	+	+	+
Genetics	-	-	-	-	-	-	-	-	-	-
Health Sciences	-	-	-	-	-	-	-	-	-	-
Internal Medicine	-	-	-	+	+	+	+	+	+	+
Microbiology	-	-	-	-	-	-	-	-	-	+
Neurology	+	-	+	-	+	+	+	+	+	+
Obstet/Gynecology	-	-	-	-	-	+	-	+	+	+
Ophthalmology	-	-	-	-	-	-	+	+	+	+
Pathology	-	-	-	-	-	-	-	-	-	+
Pediatrics	-	-	-	-	-	+	-	+	+	+
Psychiatry	-	-	-	-	+	-	+	-	+	+
Psychology	-	-	-	-	-	-	-	-	-	-
Radiology	-	-	-	-	-	-	-	-	-	-
Social Medicine	-	-	-	-	-	-	-	-	-	-
Surgery	-	-	-	+	-	+	-	+	+	+
No. of depts. that have operational CAI-programs	U : 4 V : 0		5 4		7 8		12 11		15 15	
No. of depts. with CAI-programs in **neither** school	21		17		12		10		8	

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Systematic Training of Clinical Skills in the Netherlands

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(Abstract)

In Dutch medical education recently so-called systematic skills training programs have been implemented. These courses are introductory and additional to the combination of working and learning in the clerkships. From evaluation studies it has been proved that the more traditional learning processes in the clinical setting often must be qualified as "accidental" and of the "trial and error" type. From the educational point of view, the acquisition of skills has to be more systematic and step-by-step. It needs carefully designed and controlled educational settings, which mostly cannot be achieved in the current health care setting.

Since the early 1980s, such systematic skills training courses have been introduced to all Dutch undergraduate medical curricula, as well as to the vocational training of medical practitioners. The conference presentation will deal with: - an overview of the educational advantages of the sytematic training of clinical skills - a comparison between the main features of such courses between all Dutch medical faculties - a description of the national cooperation in the further development of methods of instruction and assessment.

The Use of Interactive Multimedia Technology in the Education and Continuing Education of Dentists

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W. Schneider, University Datacenter, Uppsala, Sweden

(Abstract)

One of the key issues in dental education is the availability of high quality images, sequences of images, and films of specific procedures. When educating ex cathedra there are in general acceptable solutions to problems related to this issue, although the rapidly increasing use of modern interactive media technology will augment and facilitate the availability of image-based educational materials as well as their practical use in this form of education.

Two main problems have, however, been observed: the difficulty of delivering an audio-visual documentation of the courses and the increasing need of individualized education.

It is the purpose of this paper to demonstrate the innovative character of advanced interactive multimedia technology in the education and continuing education of dentists. A computer assited continuing education program is presented, covering topics such as the process of satisfactory biological adaptation (stomatitis prothetica) as well as differential diagnosis and therapeutical procedures in cases of stomatitis prothetica.

Studienmodell Physiologie (SMP) - Multimedia Database Information and Communication System for the Teaching of Medicine

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Universitätsklinikum, Essen, FRG

(Abstract)

A teaching-oriented multimedia information system STUDIENMODELL PHYSIOLOGIE utilizing advanced technology has been developed, based on Personal Computers (PS 2/ MS DOS) connected to audio/video (disk, tape) and digital (WORM) stores, and interconnected by network (Token-Ring). The system provides a multimedia database, capable of text analysis, for storage of all kinds of data (alphanumerical, video pictures and films, images digitized via scanner, recordings of analogue signals, programs for data acquisition and simulation), and user-friendly software for input, editing, retrieval and communication. An authoring software permits the compiling of any such material (including modules from other authoring systems linked to SMP) into structures of menus, and combining these with free database access.

This concept is expected to open new ways for audio-visual (AV) and computer assisted instruction (CAI) by a): incorporation of all types of data, with direct transfer from the scientific to the teaching level, b) full integration of AU and CAI into personal teaching through the possibility to compose teachware locally and individually for lecture demonstrations, practical and self-instruction, c) free access of students to data and program bases for individual learning with information systems, d) transferability of the system concept to other medical and non-medical fields of education.

Ref.: W. Wiemer et al.: Studienmodell Physiologie (SMP) - Multimedia Database Information and Communication System for the Teaching of Medicine. In: International Symposium of Medical Informatics and Education, R. Salamon, D. Protti, J. Moehr (eds.), University of Victoria, B.C., Canada, 1989, 477-480.

3. HEALTH POLICY AND MEDICAL EDUCATION

Chairs: Prof. M. Garcia Barbero (Spain); Prof. A. Oriol-Bosch (Spain)

Field practice in medical education: An experience from turkey

Dr. Gazanfer Aksakoglu
Dokuz Eylül University
Faculty of Medicine Izmir, Turkey

(Abstract)

The Narlidere Research and Education District is a joint project of the Ministry of Health and the Dokuz Eylül University. With its one urban, one semi-urban and one rural health centre, tasks of all Primary Health Care (PHC) are covered. Interns of the Faculty of Medicine, approximately 200 of them each year, visit the District and work with the Medical Officer (MO) under the supervision of the staff members of the Department of Public Health. The duration of the studies is two months.

Interns are educated in two main tasks of PHC. Curative medicine at the primary level is practised by examining and prescribing the patients under the close control of the MO. Preventive medicine is taught by the observation and the practice of duties of the non-physician personnel during their field and home visits.

Besides getting involved in the daily routine of the health centre, the interns have to: a) complete and present a form on the demographic situation and health conditions of the health centre area, b) administer and present an epidemiological survey as a group study and c) follow up and present a critical family with specific social and physical ill-health.

At the end of their two-month stay, 92% of the interns assert that they have improved their skills and that they feel more confident.

Education and the Health of Populations: How Do We Innovate Traditional Medical Education?

Prof. Dr. J.M. Greep, University Hospital of Maastricht,
The Netherlands

(Abstract)

Traditional medical education has had until recently no connection with real health needs and is mainly hospital and equipment-oriented. Educational programmes tend to separate specialized medicine and population-based medicine. This has resulted in a multiplication of disciplines which has lost sight of the vast scale of health problems.

Medical schools often fail to focus on the needs of society, caused by a lack of concern for the problems of the individual and the community. Health care today places an increasing emphasis on all determinants of health, and doctors will require an improved understanding of the population's needs. Educating health professionals today therefore has to be in response to community health needs. This includes strategies for scientifically determining health needs (epidemiology), which are important for strategies and actions of future health workers. They have to meet the changing needs of society not only in relation to medical, social and economic considerations, but also in the context of continuing rapid advances in medical science.

The Importance of Education in Forensic Medicine for Medical Students in Turkey

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Çukurova University Faculty of Medicine, Adana, Turkey

(Abstract)

The education programs in forensic medicine and their problems have been discussed in various aspects in the world. In Turkey, medical practitioners have responsibilities for preliminary legal reports on crime victims and legal autopsies. Because of these, education in forensic medicine has special importance for medical students in our country.

It has been observed that practical training in forensic science using the opportunities of the forensic science organisation departments has a great value to medical practitioners during their internships.

4. TEACHING AND LEARNING ASPECTS

Chairmen: Prof. N.-H. Areskog (Sweden); Prof. D. Taner (Turkey)

Peer Teaching in Social Medicine Education

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* Department of Development and Research in Medical Education NPOG,
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** Institute for Social Medicine,
University of Amsterdam, The Netherlands

Abstract

A description will be given of a small, peer group teaching educational method. In this method, students are given responsibility in presenting subject matter to other students, and in leading a group discussion. The method was introduced to respond to a negative evaluation of the existing course. According to an evaluation, the new method met with appreciation among both students and teachers. Some theoretical issues on the peer teaching method will also be discussed.

1. Introduction

Have you ever had the experience that after your efforts in carefully preparing a series of small group discussions, students don't seem to be interested? And are you left with a puzzled and uncomfortable feeling that you did something wrong, but you're not sure what?

The following year you prepare your lessons even better: you look for interesting examples to illustrate your subject matter, you write a compelling syllabus, you even invite experts to illuminate highlights of your main topic. Yet many students just don't get excited. You then give them detailed reading assignments for the next session to stimulate deeper discussions. You find, though, that it doesn't help; some have indeed read the material but many have not. They are adults so you don't want to send them away, but you feel instead that to get the discussion going, some explanation of the subject matter is needed. During your monologue the lazy students stare at you and the virtuous students get bored and decide by themselves that there is no need to prepare for the lessons any more. You thus end up giving lectures, not understanding why students these days seem so uninterested in everything, and hope that next year's group will be more like the way students used to be.

Now let's analyse what's gone wrong here. What really seems to be happening is that the more energy the teacher spends in the didactical structure of the session, the less energy the students invest in studying.

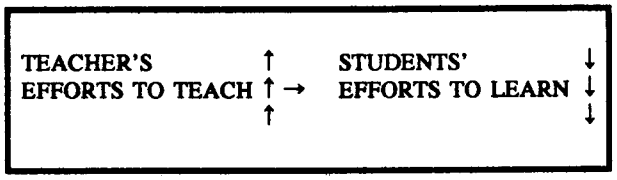


Figure 1:

It seems as if students get spoiled when the presentation of the material is didactically perfect. The ironic result is that the teacher, who ends up spending so much time perfecting the course, has never before mastered the course content so well. But his/her aim was to get the students to master the subject.

What you really want is for the students to start doing what the teacher is currently doing. And what the teacher does is, in itself, not important, as long as it encourages the students to study.

The teacher should therefore not be an excellent speaker or writer, but an excellent manager of student learning. She/he should get the students to work. Compare the teacher with a business

manager. The manager doesn't get the employees to work by doing the work for them, but by getting them motivated to do the work.

2. Peer Teaching

Problems as described above were faced in a third year course of Social Medicine at the University of Amsterdam. The course had the following characteristics:

* 4 sessions of 2.5 hours each. Topics:
  - Health law and medical ethics
  - Occupational medicine
  - Social security
  - Intramural patient care
* 10 hours of (planned) individual study
* compulsory attendance, no examination
* in total 18 groups and 14 teachers involved

Both students and teachers were generally dissatisfied with the course. The main complaints were:

STUDENTS:

* quality of the session depends heavily on the particular teacher
* discussions do not get started
* subject matter seems to be a repitition of prior topics
  students wish to be able to change groups to have the "best" teacher

TEACHERS:

* students do not prepare the reading material
* students are not motivated by the subject matter
* students do not become actively involved in the discussions.

It was decided to radically change the structure of the course. Characteristics of the new course are as follows:

* students bear the major responsibility for the sessions, teachers coach students in explaining subject matter to their peers
* minimal knowledge transfer by teachers
* learning goals to be reached without examination
* learning goals only generally formulated.

To achieve these characteristics a peer teaching format was chosen. Students themselves were given responsibility to dig into the subject matter and to present the highlights of each of the four main topics to the other students. The following set-up was chosen:

* 18 groups of 12 students each
* four sessions of 2.5 hours
* each group divided into four peer teacher teams
* each team responsible for one session
* each team assigned one of 14 teachers
* each session consists of:
  - presentation by the peer teacher team
  - discussion, guided by the peer teacher team
  - (feedback/reflection from teacher)

Visually, the following format was achieved:

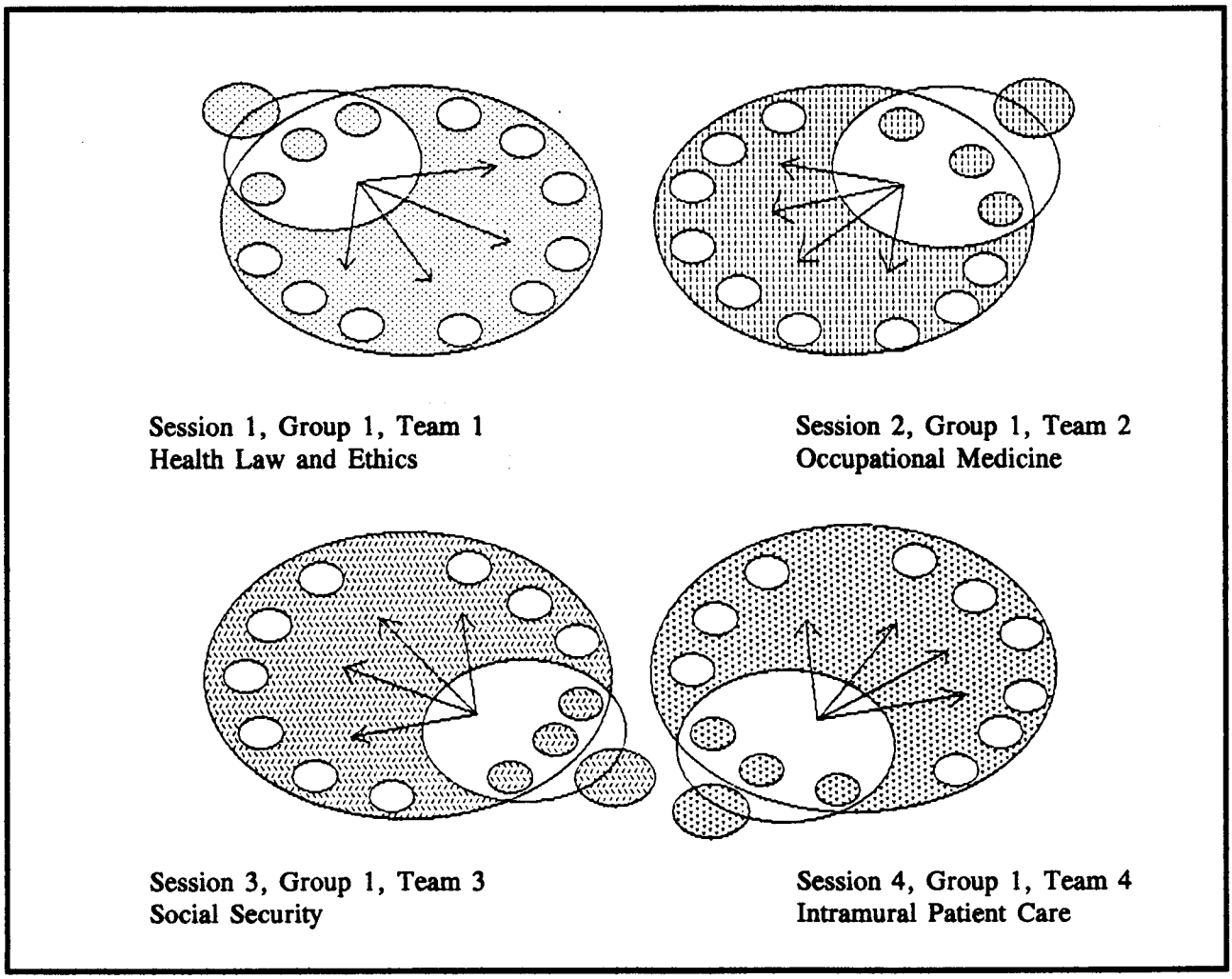


Figure 2

The peer teacher teams were not provided with a comprehensive reading source. Instead, all students were given a study guide containing the following:

* a general outline of the course and a description of the tasks for the peer teacher teams
* tips for preparing a session and leading a discussion per session:
  - title of the topic
  - introduction of the topic (1 page) minimum list of items that should be discussed during the session (1 page)
  - list of relevant references

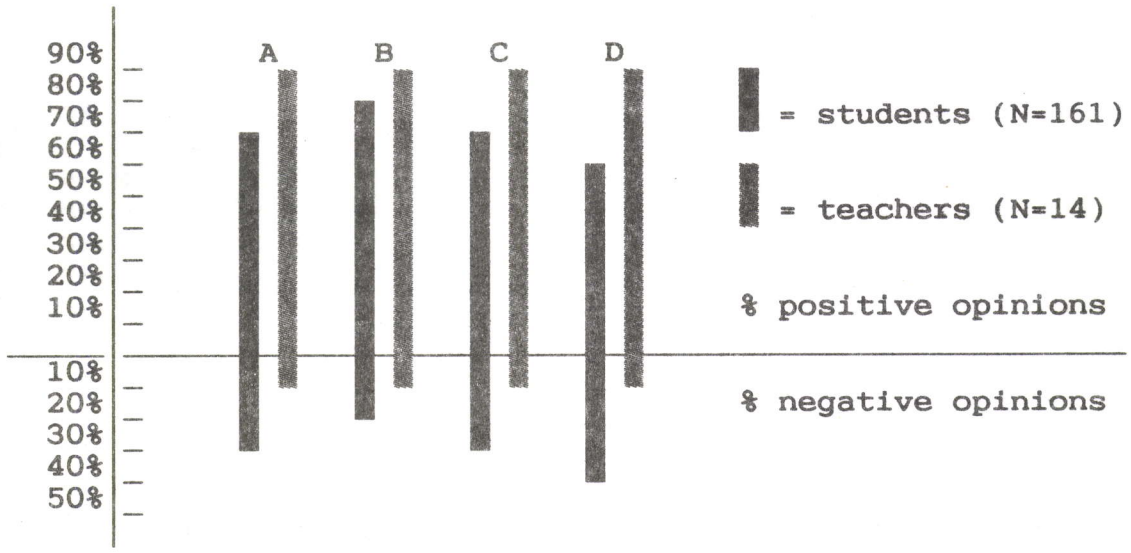
The assigned teacher was to be available in the preparation period for the session. At least once (two weeks before the presentation), preparations were to be discussed with the teacher.
If a team wished to address a topic different from the ones suggested in the study guide, consent of the assigned teacher was necessary and was given as long as the presented topic would fit in the main theme of the session.
During the presentation the teachers were present as "expert listeners"; they were asked to give feedback at the end of the session.
The teacher's tasks can be ummarized as follows:

* preparing the study guide
* coaching peer teacher teams as much as necessary
* during the session: listening to the presentation and discussion
* at the end of the session: giving a reflection on the topic

3. Evaluation

After the first implementation, a detailed questionnaire was sent to all the students and involved teachers. The results were generally positive (Ten Cate & Wendte, 1988). There is unfortunately not enough space to show all the

results, but a general overview can be seen in the following diagram:



A: have students learnt more or less about Health Care, compared with teacher-led education?
B: do you consider this educational method pleasant or unpleasant?
C: have students been adequately stimulated to study by this method?
D: do you think more education should be carried out this way?

Figure 3.

4. Discussion

This contribution has so far mainly focussed on the practical implementation of a peer teaching format. More fundamental questions may be raised, however.

i) Why is peer teaching especially beneficial to those students who teach others?

Educational research has learnt that teaching others is a powerful learning tool. This might be due both to the psychology of studying the material (with the intention to explain orally the topics to others, instead of producing it on an examination). The theoretical notion behind this is that the relative freedom the students have in setting their own learning goals (ie. the process of deciding which topics are important enough to explain to others) is beneficial to learning. Another explanation bears to the rehearsal of the material aloud during the presentation of the group session.

ii) Isn't being taught by a peer less effective than being taught by a teacher?

One might suppose that students who listen to the peer teacher presentation and engage in the discussion as non-peer teachers might not benefit from replacing the real teacher by students. However, randomly controlled experimental research that has been done in this field indicates that students learn no less from a well-prepared peer student than from a teacher.

iii) Who bears responsibility for the course in a peer teaching format?

As long as peer teaching is part of the regular curriculum, the teaching staff should have and keep full responsibility for the course. This should be realized by carefully formulating the framework of educational goals within which the peer teaching must take place and by the monitoring of what students are doing. Although

much freedom can be given to students, the final responsibility should never be given to the students.

iv) Is peer teaching a solution to budgetary cuts?

Budgetary cuts should never be the primary motive of any educational innovation. Peer teaching does not mean that the regular teaching load is shifted to the students. The teaching load is, however, changed from the preparing and executing of a monologue to carefully formulating learning goals, composing a list of literature sources, organizing the course and guiding students. These activities may not take less time for the teacher than simply teaching.

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Changes of Diagnostic Judgment After a Patient Demonstration: Both Improvement and Impairment

H.J.M. van Rossum, W. Bender, E. Briet, A.E. Meinders, Dept. of Internal Medicine, Leiden University, The Netherlands

(Abstract)

Experts have better diagnostic judgment than medical students because of a greater exposure to patient problems. This exposure starts with patient demonstrations in the undergraduate curriculum. What is the effect of one particular patient demonstration on the diagnostic judgment of undergraduate students?

A patient was demonstrated to the randomly selected half of a group of third year medical students. Two weeks later the complete group took two written tests. The first script was based on the demonstrated patient, the second script was derived from a patient with similar complaints but a different diagnosis. For both scripts the students had to express their subjective probabilities of eight listed diagnoses on a 7-point scale.

Analysis of variance showed that students who attended the demonstration in both cases gave a higher probability to the diagnosis that belonged to the demonstrated patient than the students who did not attend. In the first case they came closer to the score of a panel of experts, in the second case they did not. Similar results were obtained from a second experiment based on a patient with a completely different diagnosis.

It can be concluded that improvement of diagnostic judgment of the demonstrated case was not obtained for a non-demonstrated case. This conclusion is consistent with the concept of content specificity of expertise, but raises questions about the number and nature of patients that students have to be exposed to in medical education.

Training the Clinical Eye Through Slides

AJJA. Scherpbier, HW. van Lunsen, MH. Ijspeert-Gerards, D. Soeters, W. Bender, Dept. of Surgery, University Hospital, Groningen, The Netherlands

(Abstract)

In medicine the inspection is an important skill. Among physicians, this statement will not lead to heated debate. Therefore, it seems strange that in basic medical education this skill should not be specially trained. An explanation could be that inspection is not so difficult, or, in other words, that physicians are rather good at observing patients.

Some research points to the contrary. Cassileth and co-workers asked physicians to identify coloured slides of cutaneous lesions. Their performance in recognizing suspicious or problem lesions was very poor. The results of this study support our view that in inspection skills training is necessary. In such a programme students should not be stimulated to play the game of "spot diagnosis". To avoid this dangerous game, students must learn to gather data by observation in the same way as in history or physical examinations. One might regard this type of training as a kind of consultation through slides. For several years we have tested this programme in our Introduction to Clinical Medicine course. In the presentation a session will be simulated.

Distance Learning for Medical Student Teaching

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University of Wales College of Medicine, Cardiff, Wales, U.K.

(Abstract)

Clinical attachment of medical students to District General Hospitals (DGHs) can present problems for the integration into the didactic lecture course held at the Medical College. We have studied whether the use of videoed or audio conferenced lectures delivered directly to the DGH can provide the same information accrual as by didactic lectures.

One year prior to the commencement of the present study, one third of the first clinical year lectures were videoed. The following year, the lecture course was divided into three sections. In section one, students received their didactic lectures in the Medical College. Section two (voideoed lectures) and section three (audio conferences) were provided to the DGHs. The pattern was repeated every three weeks.

At the end of the course, students took an MCQ examination, identical to the previous year. It contained stem questions related to specific items covered in the three sections. Overall there was no change in the scores achieved.

This study has identified specific problems in the use of distance learning techniques. The dissemination of information may not be suited to all forms of distance communication, and careful choice of subject and lecturer is paramount.

Development of a National Workshop on Undergraduate Teaching in Obstetrics and Gynaecology (OB-GYN)

David W. Purdie, Dept. of Obstetrics and Gynaecology,
University of Leeds, England

(Abstract)

The content and design of an undergraduate course in a particular discipline naturally varies widely between a nation's medical schools, although the strategic aims of the teaching will usually be laid down by a national regulatory board.

Although academics, as clinical researchers, frequently meet to discuss mutual problems and to hear original scientific data, those same academics as teachers rarely, if ever, meet to discuss mutual problems and to hear original educational data.

In an effort to promote, in education, the same intellectual rigour that academics must display in science, three national workshops have now been held in the UK in 1986-1988 on the subject of art and science of undergraduate OB-Gyn course design and management. The meetings were held in workshop format and were attended by a representative from over 90% of the medical schools of the UK and Ireland. Representation was limited to one delegate per medical school at the Professorial or Senior Lecturer level. In addition to the clinical staff, expert delegates were invited from the fields of educational psychology, the basic science disciplines and computer assisted learning. The meeting addressed the issues of: place of OB-Gyn within the curriculum; identification of core data; liason with neonatal paediatrics; liason with basic science disciplines; policing of course content and examination practice.

The workshops have now been attended by 50% of all OB-Gyn staff in the UK and are firmly established. The practical problems of setting up and operating such a meeting will be discussed together with the educational advantages of such inter-university meetings with respect to the dissemination of innovatory practice, and the renewal of enthusiasm among academic teachers.

5. EVALUATION METHODS

Chairmen: Prof. D.I. Newble (Australia); Prof. H. Pauli (Switzerland)

Taxonomy of Essay Questions in Internal Medicine at the Final Examinations of Medical Studies

Sigurd H. Seim and Carl. W. Janssen.
A survey from the Medical Faculty of the University of Bergen, Norway.

The educational system at the Medical Faculty of the University of Bergen is a traditional one, divided into a pre-clinical study period of 2.5 years and a clinical period of 3.5 years. About 80 students pass the final examinations every year. The exam system is on the whole a conventional one, relying on a combination of oral examinations in clinical bedside settings, and on written papers answering essay questions within a limited number of hours and unassisted by any kind of reference literature.

This study was undertaken to provide insight into the kind of influence on medical students' learning strategies that could be deduced or expected from the taxonomic level of the exam questions at the written test. Students read and try to solve questions presented at previous exams during the final revision of their knowledge. Our basic presupposition is that these questions constitute forceful directives for the students' way of learning, especially since they have not been given any other written statements about study aims and objectives. Besides judging the taxonomy we have also looked into the contents and the format of the questions and, finally, have tried to form an opinion on relevance.

Our material is the collection of forty sets of exam questions in internal medicine, given in a twenty year period from 1962-1981. Each set consists of four to six different questions. Some questions have been repeated in identical fashion at intervals, but altogether there are about 180 different questions.

We applied the taxonomy introduced by Bloom (Table 1), stating six levels of competence, each higher level in the hierarchy presupposing mastery of the lower. There were some difficulties in determining taxonomic levels in a number of questions, partly because of low precision or vague formulations, but also because of ambivalence. This means presenting a problem in a way leading up to one of the higher taxonomic levels, but then locking it to be answered on the lowest levels by specific demands of factual knowledge. In a general way, the two lower levels could, in our judgment, be merged together. The third level, application, would mostly be somewhat indeterminate, more or less like an appendix to the second level.

Table 1.

TAXONOMY (a.m. BLOOM)
1. Knowledge
2. Comprehension
3. Application
4. Analysis
5. Synthesis
6. Evaluation

The evaluation of the students' work is a joint task by one of their teachers and a general practitioner not belonging to the faculty staff. In our experience, students' answers in exam questions are rewarded with higher marks if they endeavour to reach a higher taxonomic level than that of the questions themselves. At least this holds true in the three lower levels. Students might even feel they have to choose between the lowest level and one of the higher in their answers, according to their interpretation of the text. According to the general assumption that clever students should give a display of an admirable wealth of factual knowledge, they safeguard themselves by recounting textbook presentations or stating theoretical principles at length, even if this is obviously outside the scope indicated by the question.

The results of our investigation are shown in Tables 2 - 5. They may be summarized as follows:

There is a total dominance of questions at the lowest taxonomic levels, the third level often being difficult to judge (Table 2). There are no questions on a higher level than the fourth analysis.

Table 2.

Taxonomic Level	OBSERVATION DATA Period 1962-71	Period 1971-81
Nr. in Level 1	89 (95.8%)	76 (85.4%)
Nr. in Level 2	?	?
Nr. in Level 3	?	2
Nr. in Level 4	4 (4.2%)	11 (12.3%)
Nr. in Level 4	0	0
Nr. in Level 6	0	0

Grouping the questions somewhat arbitrarily, according to format, we find the great majority in the group of free essay questions, the "on" questions as one might well call them (Table 3). Far fewer can be classified as belonging to one of the other four groups, which constitute different kinds of specified and limited essay presentations.

Table 3.

TYPES of EXAM QUESTIONS Grouped According to Format and Content	
Group I	: Free Essay
Group II	: How to Proceed / Solve
Group III	: Normative / Conditional
Group IV	: Exemplify / Describe
Group V	: Record, Present, Interpret

Some examples of group questions might demonstrate more precisely the kind of questions classified in the groups (Table 4). One pertinent comment would be to ask when students were taught how to proceed to clarify medical problems in general practice, an experience not included in the curriculum.

Table 4.

EXAMPLES OF GROUP QUESTIONS	
Group I	: On treatment of... : On causes, symptoms and signs of... on contraindications of... Give an account of...
Group II	: Finding glycosuria in A ... an old, overweight person, detail/discuss further steps of investigation
Group III	: How should you proceed to clarify... in general practice?
Group IV	: Give an example of a diet for... .. Describe the blood smear of...
Group V	: State the approximate calorie content of... Interpret the clinical value of the X-test How do you carry out the X-test?

The subject matter of the questions is shown (as far as main categories are concerned) in Table 5. Going into still further detail, we found it remarkable that questions regarding rheumatic conditions were represented by only one to two percent of the total. Even more remarkable was the total absence of questions concerning vascular disease of the brain and of questions about bronchial asthma, lung fibrosis and cancer. Further, questions with regard to prognostic evaluations were virtually absent. Diseases of the urogenital system represented ten percent of the total.

Table 5.

DISEASE CATEGORIES COVERED BY QUESTIONS.		
Diseases	Percentage of Questions	
	Period 1962-71	Period 1972-81
of heart/per. circ.	19.5%	22.5%
of blood	11.0%	13.5%
of lungs	6.5%	8.0%
of G.I. tract, liver pancreas	10.0%	18.0%
of endocrine system	13.0%	10.0%

Defining the high relevance of the questions as limited to those concerned with the ability to diagnose and treat acute life-threatening conditions, and conditions entailing the risk of serious and lasting health injury, we could demonstrate such relevance in a total of 22 of 110 questions belonging to group I (see Tables 3 and 4), all being in the two lower taxonomic levels, and in six questions belonging to group II. These could be assigned to the fourth level of the taxonomic scale.

Conclusion

We should not be misinterpreted as considering it not legitimate to test factual knowledge. This is clearly necessary and important. Our criticism pertains to the very great dominance of questions about factual knowledge, and we are concerned about the influence on students' learning strategies. We consider the written essay format appropriate to test factual knowledge of data and principles and of problem-solving ability in matters of high relevance as outlined above. Questions of lesser relevance should be answered with access to handbooks and/or tables. The subject matter of exam questions should be balanced and representative. Study aims and objectives should be stated separately from the written exam texts, which must have an obvious and close relationship to the former.

What do Examiners Assess: Performance or Behaviour?

R.J. Hiemstra, W. Bender, BOOG, Faculty of Medicine,
Groningen, The Netherlands

(Abstract)

The Objective Structured Clinical Examination (OSCE) offers a framework for the assessment of clinical competence. The validity and reliability of this examination is enhanced - though not guaranteed - by the use of direct observation, detailed checklists and standardized patients.

In poorly controlled examinations, the student's score may be threatened by characteristics of the patient or the examiner. Moreover, the examinee may bring factors into play other than his/her performance. A well-known phenomenon in this respect is the primacy effect, which refers to the dominating influence of a first impression over following impressions. The primacy effect was investigated in the following way:

We had at our disposal videotaped performances of 21 students obtaining a history from a standardized patient. These performances had been assessed independently by seven teachers, with the help of a checklist. Out of these tapes, another video was constructed, containing only the opening phrases of the examinees. All fragments were cut before the examinee addressed the problem of the patient. This collection of initial behaviour of the examinees was shown to a group of students, standardized patients and teachers (N = 43). They were asked to predict for each examinee the quality of the performance.

The rank order correlation with the scores of the seven teachers was 0.43. In other words, the predictions turned out to be prophecies.

Students Evaluate Psychiatric and Psychosomatic Lectures

C. Rieger, J. Büttner, T. Loew, M. Merklein, P. Joraschky,
Psychiatric Clinic, University of Erlangen

(Abstract)

We will report on the evaluation of a cross-section study of a medical teaching program by 121 students in the 2nd clinical term at the University of Erlangen in 1988.

We asked the students to evaluate the existing medical curriculum and to specify where they thought they had obtained their theoretical and practical knowledge, and to communicate their wishes regarding these points. We were specifically interested in the evaluation of the local psychiatric and psychosomatic lectures and in the question of how far former participants of Anamnesegruppen and non-participants differed in their evaluations.

6. PSYCHOLOGICAL ASPECTS, MOTIVATION AND PERSONAL DEVELOPMENT IN MEDICAL EDUCATION

Chairmen: Prof. H. van den Bussche (FRG); Prof. H. Walton (WFME, UK)

Personality Development, Scientific Training and the Selection of Future Doctors

Dr. J.J. Baneke Dept. of Clinical Psychology University of Amsterdam The Netherlands

(Abstract)

In an empirical study on achievement in medical education, scores on personality questionnaires, intelligence tests, and other individual characteristics of two groups of students were assembled as potential predictors of success in medical training.

In a parallel research program on stress in medical education, first and fourth year students, and male and female students were compared. The results of both projects will be discussed in relation to personality development, scientific training and the selection of future doctors.

History Taking Groups: Focussing on the Person

J. Büttner, A. Grünsteudel, P. Joraschky, C. Koch, T. Loew, M. Merklein, C. Rieger; Psychiatric University Clinic, Erlangen, FRG

(Abstract)

It is unfortunately often the case in medicine today that the doctor is only interested in the patient's illness and not in the patient as a person. His or her needs are ignored and even regarded as an inconvenience.

Medical training is little concerned with fostering the ability to confront and enter into a relationship with the patient. The idea of working as part of a team is also neglected. The student is left to his or her own devices. This state of affairs gave rise to the creation of the Anamnese gruppen (history taking groups). They present a forum for the students to have contact with patient-centred medicine.

Each participant of the group holds an interview with a patient and tries to develop a positive relationship with him/her. Later the students discuss the interview in the group. The patient with his/her illness, rather than just the illness itself becomes the main subject.

This so-called biographical history-taking is not part of the curriculum in German medical schools. Therefore, these self-help peer groups are for many students the only opportunity to learn the practical aspects of this concept.

Shortcomings of Medical Education Which an Application of a Science of Science Can Reveal

Eberhard Göpel (Dr.med.), University of Bielefeld, FRG

(Abstract)

The "clinical approach" which has become the basis of medical education since the 19th century, has been a major step forward toward a scientific foundation of medical practice.

The reduction and limitation of medical education and practice to this approach, however, is insufficient and appropriate. Given the general aim of medical practice to promote and support human life processes in critical situations, it can be shown that the cognition theory of the clinical approach only covers a very limited perspective of relevant processes.

Since medicine has failed so far - in contrast to other sciences - to reflect on its theoretical knowledge base and paradigmatical model, systematically it tends to become a scholastic endeavour and a closed belief system with medical education on the basis of multiple choice questions as the initiation rite. Medical education which is not grounded in a systematic reflection of its cognition base, is despite its claims, unscientific and scholastic. It tends to loose the human dimension and reduces itself to applied veterinary medicine. As can be shown, the inclusion of other scientific models such as a culturological, a phenomenological or a systems approach would have a far-reaching impact on the organisation of medical education.

The question is posed why medical education deals so unscientifically with its scientific base.

Clinical Teaching at the Sackler School of Medicine and a Proposition for Guidelines

Y.S. Sandhaus, M. Friedman, M. Ravid, M. Prywes, Israel

(Abstract)

The purpose of this survey is to "diagnose" the aims and methods of clinical teaching and learning in the clinical years at the Sackler School of Medicine of Tel Aviv University. Questionnaires were distributed among senior clinical teachers (department heads) and to junior staff members (tutors) in 90 affiliated wards in various medical disciplines (mostly the major ones: internal medicine, surgery, gynaecology, paediatrics and psychiatry). The wards were chosen at random from the list published in Hebrew in the Sackler School annual bulletin. The results of the survey, after statistical evaluation, showed no differences regarding the topic between the senior teachers' group and the junior teachers' group. The teachers in general agree that general guidelines for the clinical years at the Sackler School of Medicine should be laid down. These are necessary because of the location of many affiliated wards in different parts of metropolitan Tel Aviv, a factor leading to a lack of unified standards. The teachers, in responding to the questionnaire, have provided the basis for overall clinical educational guidelines.

7. THEACHER TRAINING

Chairs: Prof. M. Eriksson (Sweden); Prof. E. Kansu (Turkey)

A Ten Year Experience in Medical Education

Vittorio Ghetti, Fondazione Smith Kline, Milan, Italy

(Abstract)

A short report on the activity of the Smith Kline Foundation (World Health Organization Collaborating Centre in Health Manpower Development), started in 1979 in the field of undergraduate medical education will be presented.

The report will explain how the trainers for medical teachers of 28 medical faculties were recruited, the method employed, the problems connected with tutor training and the contents of the educational process. A tentative cost/effectiveness analysis of the whole project will be made.

Training GPS in Teaching Students

Pierre Klotz, M.D. and André Cholal, M.D., UNAFORMEC,
Paris, France

(Abstract)

Specific training of future GPs started in France only four years ago. It is a pregraduate course, carried out during the seventh and eighth years of medical studies. It includes a hospital residency, vocational training periods in general practice settings and theoretical teaching.

The 1500 GPs entrusted with the latter in many decentralized centers were selected among volunteers, mainly according to their CME activities. Most of them, however, had never taught before. The "National Union of French CMO Associations" (UNAFORMEC) therefore implemented a national educational program in order to train them in active pedagogy and to help them think over their own practice and to work out useful contents for theoretical teaching.

From the beginning of this program in 1986 up to 1988, 712 registrations were listed concerning 405 GPs and 450 are expected this year. The 1989 program includes 10 three-day national sessions in Riom, near Clermont- Ferrand. Contents, pedagogical methods and material conditions are described. These figures don't include eleven decentralized regional sessions meant for tutors accepting trainees for instruction periods in their surgeries; theese sessions will start in September 1989.

SESSION V:

TOGETHER WHITH THE IV. ANNUAL MEETING OF THE CHINESE-GERMAN/GERMAN-CHINESE SOCIETIES OF MEDICINE

Chairmen: Prof. F.H. Kemper (FRG); Prof. A. Oriol-Bosch (Spain); Prof. Qiu FA-zu (PR China)

1. REPORT FROM THE STUDENTS' MEETING

Darek Gawronski (3rd year medical student, Warsaw, Poland)

I am pleased to express the opinions and reactions of the students to this year's conference. My comments will be brief, direct and to the point.

1. Bearing in mind the fact that AMEE aims to promote innovations and new methods in teaching, the students feel that the format of this year's conference was inappropriate. The lectures were too long and the time given for discussion too short. We feel that shorter lectures with discussions in small groups of 8 or 10 people would be a more constructive way of dealing with the topics presented.

2. Many people have spoken about different methods of learning, for example, problem-based learning. But in spite of this, we feel there has been little explanation and no argument about a theoretical basis which underlines these methods. Furthermore it seems strange to simply talk about something without allowing everyone to participate in such an activity. We cannot lecture about experiential learning without inviting our audience to experience it. We are in a much better position to pose relevant questions and discuss the effectiveness of a method after direct, hands-on experience.

3. A general question emerged among many students: is the AMEE conference a place to meet each other every year and have a nice time together, or is it a place to challenge people's assumptions to make them really think about things and disscuss them critically? We students intend to practise what we preach and we would like to begin our dicussion of these points immediatly.

2. MEDICAL EDUCATION IN CHINA

The Present Status of Higher Medical Education in China

Li Zheng-Zhi, Zhejiang Medical University,
Peoples Republic of China

1. The Development of Higher Medical Education from 1949-1987

The People's Republic of China is a developing country, and its higher medical education is developing, too. At the time of the founding of new China in 1949, there were only 38 higher medical and pharmaceutical schools nationwide with 15,000 undergraduates. In the 38 years thereafter, Chinese people took a tortuous and arduous course in their progress, especially with the calamity of the so-called "Cultural Revolution", which lasted 10 years. However, great progress has still been attained. Since 1978, the policies of reform and opening to the outside world have been pursued by the state, and great attention has been given to medical education, including higher medical education. By 1987, there were 134 higher medical and pharmaceutical colleges and universities (including 11 medical faculties in certain universities) with up to 182,000 undergraduates. As compared with those documented in 1949, the number of medical schools and undergraduates has increased by 3.5 and 12 times respectively. From 1949 to 1987 the medical graduates totalled 618,000. Of course, as far as the need for medical service is concerned, with a huge population of over one billion in our country, there remains a great gap to be filled.

	Universities or Colleges	Undergraduates	Graduates
1949	38	15,000	---
1978	98	113,000	618,000
1987	134*	182,000*	---
	*(incl. 18 with 3-year schooling)	*(with 34,000 undergrads. of 3-year schooling)	

Figure 1. The Development of Higher Medical Education.

Nowadays, a fairly comprehensive medical education system has been set up consisting of primary, secondary and higher medical education, postgraduate education as well as continuing education. It greatly contributes to the supplying of diverse health manpower of various specialties for the health service.

II. Higher Medical Education Reform Since 1986

On the basis of extensive investigations and studies compiled with successive scientific verifications since 1986, the reform in higher medical education has been mainly carried out in the following respects:

1. Reforms of the Levels of Higher Medical Education

The schooling period of higher medical education has been reformed from the original 5 types of 3, 4, 5, 6, and 7 years, and transformed and standardized to the present 3 types of 3, 5, and 7 years. The schooling period of graduate medical education remains unchanged. The three-year schooling education belongs to higher professional training, and no academic degree is awarded after graduation. The five-year schooling education denotes regular undergraduate training, and a bachelor degree of medicine is granted if the student passes the graduate examination. Those who complete the seven-year training period are granted a master's degree of medicine. The territory of our country is so wide, and the levels of economic development so diverse, that the graduates are

appointed to various posts to meet the demands of medical service at different levels.

<table>
<tr><td colspan="2">Undergraduate Education</td><td rowspan="2">Graduate Education
& Resident Training</td><td rowspan="2">Cont. Ed.,
Med. Service Research</td></tr>
<tr><td>3-year-schooling</td><td>Regular</td></tr>
<tr><td>Nil</td><td>Bachelor degree conferred</td><td>Masters degree</td><td>Doctor degree</td></tr>
<tr><td>3 years</td><td>5 years</td><td>3 years</td><td>3 years</td></tr>
<tr><td></td><td colspan="2">7 years Masters degree</td><td></td></tr>
</table>

Figure 2. The Levels of Higher Medical Education in China.

2. Revision of the Specialty Catalogue and Regulations for Establishing a New Specialty

After the revision, the former 50 specialties were summed into categories and 57 varieties, including 10 varieties for trial implementation. Hence, this will make the professional spectrum more rational. The newly-established specialty should be approved and recognized by the state through due formalities.

3. Resumption of the Academic Degree-Granting System

In the last 10 years, a great concern has been shown regarding the training of high-level health personnel. Ever since 1982, following the resumption of the academic degree-granting system, 202 Doctors of Medicine and 9787 Masters of Medicine were awarded. The postgraduate students totalled over 10,000 in 1987. Nowadays there are 82 higher medical and pharmaceutical schools and 32 research institutes offering master degree programmes in 92 specialties, and doctoral degree programmes in 68 specialties.

In the meantime, the international academic exchanges with other countries all over the world have been expanded and enhanced, and quite a large number of medical students have been dispatched abroad for further study. They have numbered about 5000 in the last 10 years. They have been studying in 25 countries, including the Federal Republic of Germany. Most of them have completed their studies and have returned, and have become the mainstay of various disciplines.

4. Expansion of the Training Scala and Enrolment of Undergraduates

It is conducted by increasing and stabilizing the annual enrolment of undergraduate students to 7% of the sum total of nationwide new student admission to colleges and universities. Particularly the expansion of the three-year schooling higher medical education cannot be overemphasized. These graduates will mainly be assigned to positions in the grassroots health service and rural areas to alleviate the urgent need for primary health care thereabouts.

5. Teaching Reform

Along with the changing prevalent patterns of diseases and death and the emergence of new ideas of health, the medical model is transforming from traditional bio-medical ones toward the current bio-psycho-social medical model. A new spectrum of elective courses mainly in the humanities and social sciences has been undertaken by a number of medical colleges and universities, e.g. **psychology, social medicine, medical ethics, health economics, health care administration**, etc. These courses are just in their initial stages and remain to be enhanced and intensified.

As for the pedagogical reform, the conventional method of class lecturing, mainly imparting knowledge, has been challenged, and the stress has been placed on fostering students' capabilities of independent thinking and working in association with selfêlearning. Total and weekly lecture-teaching hours have been cut down so as to encourage early contact with clinical practice.

Certain universities are experimenting with a problem-based curriculum and small peer discussion as their main teaching method with promising results.

6. Continuing Medical Education

Postgraduate education was formerly achieved by entering short-term training courses offered by university hospitals or other major city hospitals. This enabled the training of competent professional workers in the absence of appropriate training and good organisation. It goes without saying that there is no integrated system. Presently, postgraduate medical education conducted as in-service training and closely joined with continuing medical education, which is characterized by up-dating professional knowledge, is being undertaken at certain universities. The work just starts from training house officers, and it is anticipated that after 3 - 5 years of full-time clinical training and attending relevant courses, they will be well-qualified clinicians.

7. Administration of Medical Education

The departments concerned with the state strictly adhere to the reform guidelines, i.e. presecuting strategic planning and guidance, combined with tactical flexibility and the gradual expansion of the autonomy of universities in running themselves. At the same time there is the reservation of the functions in authoritatively evaluating and approving facilities, capability and quality of teaching. In this way, the medical schools all over the country will fully display their own superiority and uniqueness and will be invigorated therefrom.

The aim of reform and development in higher medical education lies in the establishment of a future educational system which will provide a comprehensive range of specialties and medical education of distinct levels, reasonable in structure and appropriate in scale, and which will actively accomodate the needs of China's socialist construction and meet the on-going demands of the national health care undertaking.

Medizinstudium: Vergleich zwischen der Volksrepublik China und der BRD

Cand. med. Lia Qingshan (PR China)

Meine sehr verehrten Damen und Herren, ich bin sehr dankbar für die Gelegenheit heute zu Ihnen sprechen zu dürfen und einen Beitrag zum Vergleich des Medizinstudiums in China und der Bundesrepublik zu leisten.

Anders als in der Bundesrepublik Deutschland sind die Universitäten in China untereinander sehr verschieden. So gibt es beispielsweise Medizinische Hochschulen, die sich sowohl in Hinsicht auf das Ausbildungsziel, die Lehrpläne, die Ansprüche als auch die Studiendauern und den akademischen Abschlußgrad unterscheiden.

Meine eigenen Erfahrungen beschränken sich auf meine Studien-Erfahrungen an der Pekinger Universität und am Peking Union Medical College, PUMC.

Wie vielen von Ihnen bekannt ist, konnte man während der Kulturrevolution in China nicht studieren. Nach Abschluß dieser Zeit durften die Abiturienten der 10 letzten Jahrgänge, die nach dem Abschluß ihrer Schulzeit mangels Studienmöglichkeiten bereits jahrelang als Arbeiter, Beamte oder Bauern gearbeitet hatten, im Jahre 1978 erstmals gemeinsam mit den Abiturienten dieses Jahrganges eine gemeinsame Aufnahmeprüfung ablegen. Da die Aufnahmekapazitäten freilich nicht auf 10 zusätzliche Jahrgänge eingerichtet waren, war es sehr schwer einen Studienplatz zu erhalten. So nahmen beispielsweise im Jahre 1980 in Shanghai 200.000 Kandidaten an der Aufnahmeprüfung teil. In dieser Anzahl waren vor allem noch Abiturienten aus der Zeit vor der Kulturrevolution enthalten, gemeinsam mit etwa einem Drittel der kürzlichen Schulabgänge. Von den insgesamt 200.000 Prüfungsteilnehmern wurden nur etwa 10 % von verschiedenen Universitäten aufgenommen.

Um sich auf die Prüfung vorzubereiten, benötigt man fast 1 Jahr. Die Prüfung wurde zu meiner Zeit in 6 Fächern durchgeführt. Heute mögen es noch mehr sein. In jedem Fach kann man als Höchstleistung 100 Punkte erzielen. Für das Bestehen muß man mindestens 60 Punkte erreichen. Für die Aufnahme an der Universität ist dann das Gesamtergebnis maßgeblich. Bevor man zur Prüfung ging, mußte man eine Liste mit insgesamt 10 Universitäten anfertigen, an denen man vorzugsweise zu studieren wünschte. Zum Beispiel Universität X, Fach A; Universität Y, Fach A oder B, etc.. Nun konnte man freilich nicht vorhersehen, ob man bei der Prüfung gut genug sein würde, um von einer der gewünschten Universitäten mit der gewünschten Fachrichtung aufgenommen zu werden. Die einzelnen Universitäten setzen verschiedene Anforderungen an das Prüfungsergebnis. Und auch die einzelnen Fakultäten ein und derselben Universität setzen unterschiedliche Untergrenzen fest. Ist man für die an erster Stelle genannte Universität nicht gut genug, wird man an die nächste Universität verwiesen. Wenn man für keine der 10 genannten Universitäten gut genug ist, so hat man möglicherweise noch eine Chance, von einer Universität angeschrieben zu werden, die man selbst nicht in der Liste genannt hatte.

Da in China jeder Intellektuelle (dieses Wort dient in China allgemein zur Bezeichnung von Hochschulabsolventen, die in einer staatlichen Arbeitseinheit beschäftigt werden) etwa gleichviel oder gleichwenig verdient, ist das Einkommen so gut wie unabhängig von der zukünftigen Berufswahl. Das Einkommen spielt daher für die Entscheidung, was man studieren möchte, kaum eine Rolle. Eher sind hier die eigenen Interessen, das erreichbare soziale Ansehen und auch ein gewisser Ehrgeiz sowie Ansprüche an die Universität und die Fachrichtung, sowie die späteren Arbeitsmöglichkeiten von Bedeutung.

Ganz allgemein werden in China die sogenannten Schwerpunkt-Universitäten und die Nicht-Schwerpunkt-Universitäten unterschieden. Die Schwerpunkt-Universitäten sind im allgemeinen sowohl vom akademischen Niveau, als auch von den finanziellen Ausstattungen besser und stellen höhere Ansprüche. Alle Hochschulen sind staatlich. Da die Hochschulen jedoch untereinander so verschieden sind, ist es kaum möglich, während des Studiums die Universität zu wechseln. So sind auch die Abschlüsse der Universitäten von verschiedenem Wert. Die Informationen über die einzelnen Universitäten kann man vor den Aufnahmeprüfungen den Zeitungen oder auch spezifischen Informationsblättern entnehmen. Da man seinen späteren Arbeitsplatz nicht selbst aussuchen kann, spielt der Gesichtspunkt, welche Möglichkeiten eine Universität in dieser Hinsicht bietet, eine wichtige Rolle bei der Auswahl der Universität, bei der man studieren möchte.

Die Schwerpunkt-Universitäten nehmen Studenten aus allen Teilen Chinas auf, während die Nicht-Schwerpunkt-Universitäten in der Regel nur Kandidaten aus der Stadt, in der sie liegen, zulassen. Die Absolventen einer Nicht-Schwerpunkt-Universität können später auch in dieser Stadt arbeiten, weil diese Universität die Aufgabe hat, für ihre Stadt Fachkräfte auszubilden. Die Absolventen einer Schwerpunkt-Universität werden später auch an einem anderem Ort arbeiten können. Normalerweise wird man jedoch wieder dort hingeschickt, woher man kam.

Vor der Zulassung zu der Universitätsaufnahmeprüfung muß man sich einer medizinischen Untersuchung unterziehen. Manche Fächer darf man nicht studieren, wenn man behindert ist. Zum Beispiel darf ein Farbenblinder nicht Medizin, Biologie, Chemie und Ähnliches studieren. Da es für so viele Kandidaten aber nur eine begrenzte Anzahl von Studienplätzen gibt, wird man, wenn man älter ist als 35 Jahre, nicht mehr zu den Prüfungen zugelassen. Man kann an den Universitätsaufnahmeprüfungen dreimal teilnehmen. Weibliche Kandidaten werden bei der Aufnahme nicht benachteiligt. Ob sie vorgezogen werden, weiß ich nicht zu sagen. Eine gewisse Rolle können bei der Entscheidung über die Aufnahme zusätzliche Fähigkeiten und Hobbies spielen, die man bereits auf dem Antrag angibt, und die dann zum Tragen kommen, wenn die Kandidaten in anderer Hinsicht gleich sind. Hierzu zählen zum Beispiel die Fähigkeit, ein Musikinstrument zu spielen, herausragende sportliche Leisungen, Dienst als Klassensprecher, Auszeichnungen bei Wettbewerben in einzelnen Schulfächern usw.. Auch die politische Einstellung kann in Betracht gezogen werden, d.h. ob man Mitglied der KP oder des kommunistischen Jugendverbandes ist. Berücksichtigt werden alle Angehörigen ethnischer Minderheiten. In China gibt es mehr als 50 verschiedene ethnische Völker. Die Han-Chinesen stellen etwa 94% der Gesamtbevölkerung.

Die medizinischen Hochschulen sind zumeist selbständige Fachhochschulen. Sie sind nicht - wie in Deutschland üblich - als Fakultäten einer Universität angeschlossen. Ganz im Gegenteil: Medizinische Hochschulen können selbst wieder eigene Fakultäten haben. Unter den Medizinischen Hochschulen sind die Unterschiede sehr groß. So kann die Studiendauer je nach Hochschule zwischen 5 und 8 Jahren variieren. Das Ziel der medizinischen Ausbildung ist ebenfalls von Hochschule zu Hochschule verschieden, hier mehr klinisch orientiert, dort mehr Grundlagen-Wissenschaft, hier mehr westliche Schulmedizin, dort mehr chinesisch-traditionell, hier mehr wissenschaftlich, dort mehr medizinisch. Daher kennt man in China keine einheitlichen Staatsexamina als Studienabschluß.

Ich möchte nun etwas näher auf die Hochschule eingehen, auf der ich selbst Medizin studiert habe. Das ist das Peking Union Medical College, das PUMC. Das PUMC wurde Anfang des Jahrhunderts durch die Rockefellerstiftung gegründet. Der Name Union wies seinerzeit darauf hin, daß alle europäischen und amerikanischen Gesellschaften, die damals in China medizinisch tätig waren, ihre Kräfte vereinten und über das Land verstreut einige sehr gute medizinische Ausbildungsstätten gründeten.

Bis Anfang der 50'er Jahre kamen alle Professoren der PUMC aus den USA. Der Studienabschluß war mit einem amerikanischen Abschluß identisch. Die Unterrichtssprache war Englisch. Die heutigen Professoren sind zumeist ehemalige Studenten des PUMC. Die meisten haben auch einige Jahre an einer Universität oder an einem Medical Centre in den USA verbracht, mit denen das PUMC noch Austauschprogramme hat, z.B. Harvard Medical School, John Hopkins University, University of California, San Franzisco und Los Angeles. Gastprofessoren kamen überwiegend aus den USA und auch aus Japan und Australien. Für die Studenten gibt es die Möglichkeit eines einjährigen Austauschaufenthaltes in den USA. Das Peking Union Medical College ist auch gleichzeitig die Chinesische Akademie für Medizin. Dieser gehören zahlreiche Krankenhäuser und Institute auch in anderen Städten an, sowie Forschungsstützpunkte in mehreren Provinzen. Die meisten Schwerpunkt-Universitäten werden allein von dem Erziehungsministerium finanziell getragen. Das PUMC dagegen wird auch von dem Ministerium für Gesundheit unterstützt und bildet eine Ausnahme unter den Medizinischen Hochschulen, da es die einzige Medizinische Hochschule ist, deren Lehrplan 8 Jahre umfaßt.

Das gesamte Studium ist in drei Teile unterteilt und für jeden dieser Teile ist ein Abschlußzeugnis erforderlich. Es sind dies 5 Semester vormedizinisches Studium, 4-5 Semester vorklinische Medizin (also Grundlagen der Medizin genannt und 6-7 Semester klinische Medizin). Wie auch an jeder anderen Universität in China studiert man am PUMC 6 Tage pro Woche und 21-23 Wochen pro Semester. In den letzten

1-2 Wochen jedes Semesters gibt es kaum noch Unterricht und man bereitet sich auf die Semesterabschlußprüfungen vor. Die Ferien umfassen ca. 3 Wochen im Winter, einschießlich des chinesischen Frühlingsfestes (das ist das chinesische Neue Jahr) bis Ende Februar und etwa 6 Wochen im Sommer bis etwa Mitte August. In den Ferien werden Praktika absolviert, so zum Beispiel wochenlange Zoologie-Exkursionen, dann militärisches Training oder Epidemiologische Praktika auf dem Lande. Im Praktischen Jahr, das ist das 8. Studienjahr, hat man keine Ferien mehr. Alle Studenten besitzen normalerweise in der Bevölkerung ein sehr hohes Ansehen. Jeder Student oder Studentin besitzt neben dem Studentenausweis auch ein Abzeichen der jeweiligen Universität, auf dem auf weißem Hintergrund der Name der Universität in Rot aufgetragen ist. Es ist sicher so, daß die Studenten mit ihrem Universitätszeichen in der Öffentlichkeit besser behandelt werden. Der Studentenausweis ist ein rotes Heftchen mit einem Lichtbild, sowie persönlichen Angaben über Herkunft und Geburt und dem Immatrikulationsstempel der Universität für jedes Semester.

Jedes Jahr nimmt das PUMC 30 Studenten auf. Die vormedizinischen Semester absolvieren die Studenten an der Peking University, einer der besten Universitäten Chinas. Die zukünftigen Medizinstudenten sollen während dieser Zeit den Kontakt mit den Studenten anderer Faktultäten, insbesondere aus den sozialwissenschaftlichen und den sprachlichen Fächern pflegen, um auf diese Weise Erfahrungen und Grundkenntnisse auszutauschen. Die vormedizinischen Semester umfassen außer den naturwissenschaftlichen Grundlagen auch noch folgende Fächer: Höhere Mathematik, vergleichende Anatomie und Labor und Physik, analytische Chemie, quantitative analytische Chemie, physikalische Chemie, Computersprache und auch Allgemeines und medizinisches Englisch. Weiterhin politische Ökonomie, d.h. die Lehre von Marx, sowie militärisches Training und Theorie, Rechtswissenschaft und Geschichte der chinesischen Revolution.

Die vormedizinischen Studenten wohnen ebenso wie die Studenten anderer Fakultäten auf dem Fakultätsgelände. Das Wohnen ist kostenlos. Dafür wohnt man zu 6 - 8 Studenten auf einem Zimmer. An beiden Seiten des Zimmers stehen 2-4 Etagenbetten. Ein Zimmer ist 2 1/2 Bettenlängen lang und etwa 3 Bettenbreiten breit. Das sind etwa 20 m2. In der Mitte des Zimmers stehen zwei Tische, irgendwo ist noch Platz für Regale, sowie für die Koffer der Studenten mit der Kleidung und der Wäsche. Es gibt keinen Schrank. Die meist von Hand gewaschene Wäsche wird oftmals im Zimmer aufgehängt. Das Zimmer ist oft nur zum Schlafen geeignet. Man lernt in der Bibliothek und in den Seminarräumen, die bis ca. 23 Uhr geöffnet sind. Während meiner Studienzeit von 1980 - 83 gab es in der Peking Universität 6 oder 7 Mensen für die Studenten, außerdem eine Mensa für ausländische Studenten und Wissenschaftler, in der besseres Essen ausgegeben wurde, sowie 1 oder 2 Mensen für das Personal. Jede Mensa hat ungefähr 10 Schalter, vor denen man fast immer in langen Schlangen ansteht.

Zum Leben als Student benötigt man im Monat etwa 30 DM, hauptsächlich für das Essen. Wir haben jedes Semester etwa 10 DM für die Bücher bezahlt, die wir von der Universität bekamen. Das Studium selbst ist gebührenfrei. Das Geld zum Leben erhält ein Student entweder von den Eltern oder aber über ein damals von den Studienleistungen unabhängiges Teilstipendium, wenn das durchschnittliche Familieneinkommen, d.h. Gesamtsumme der Einkommen aller Familienmitglieder geteilt durch die Anzahl der Familienmitglieder, zu gering ist. In den letzen Jahren sind auch Möglichkeiten entstanden, sich über Teilzeitarbeit ein wenig hinzuzuverdienen. Wenn man als Student in den Ferien nach Hause reist, kann man eine Heimfahrtermäßigung erhalten; nach Normaltarif von Peking nach Shanghai mit dem schnellsten Zug 27 DM. Für Studenten kostete diese 1500 km und 19 h lange Fahrt ungefähr 20 DM. Wenn ein Student aus privaten Gründen über das Land reisen möchte, erhält er keine Ermäßigung.

Tagesablauf an der Peking Universität: Um 7 Uhr morgens wird jeder auf dem Universitätsgelände durch überall angeschlossene Lautsprecher geweckt, es sei denn, man ist bereits früher aufgestanden, um Sport zu treiben. Der erste Gang führt in die Waschräume und dann geht es in die Mensa, die ebenso um 7 Uhr öffnet. Zum Frühstück gibt es sehr schmackhafte Gerichte, dampfnudelartiges chinesisches Brot, Reisbrei mit Gemüse, verschiedenartig zubereitete Eier und panierte Teigwaren, aber keinen Kaffee und kein Butterbrot mit Marmelade.

Die Vorlesungen fangen pünktlich um 8 Uhr an und man muß sich ein wenig beeilen, um einen Platz in den ersten Reihen des Hörsaals zu bekommen oder auch für einige Kommilitonen freizuhalten. Zwar benutzen die Professoren ein

Mikrofon, aber es ist doch besser, vorne zu sitzen, weil der Hörsaal immer voll ist. Die Anwesenheit ist Pflicht und deswegen kommen auch alle Studenten. Für die Anwesenheitskontrolle ist einer aus der Klasse verantwortlich. Eine Klasse ist eine Studentengruppe aus einer Fachrichtung desselben Jahrganges. Die 30 PUMC Studenten des vormedizinischen Studienganges an der Peking Universität bilden in jedem Jahrgang eine Klasse und sind neben anderen Klassen in der Biologischen Fakulät eingegliedert.

Um 10 Uhr gibt es eine Pause von 30 Minuten und man hat Zeit, zu der nächsten Vorlesung zu gehen. Obwohl die Hörsäle alle auf dem Universitätsgelände sind, liegen sie doch manchmal kilometerweit voneinander entfernt und es ist sicher nützlich, ein Fahrrad zu besitzen. Zur Abwechslung kann man auch an über das Radio, das über das gesamte Universitätsgelände zu hören ist, ausgesendete IIGymnastik teilnehmen, die zu derselben Zeit auch in Fabriken, Büros und anderenorts befolgt werden kann. Die Mittagspause beginnt um 12.30 Uhr. Die Mensen sind sofort voll und man holt sich das eigene Geschirr aus den Regalen in der Eßhalle und stellt sich an einer Schlange an. Wenn mehrere Studenten sich verabreden, können sie auch an verschiedenen Schaltern anstehen und sich dann ein Mittagessen aus verschiedenen Gerichten teilen. Anschließend hat man Gelegenheit, sich bis 14 Uhr auszuruhen.

Danach finden dann weitere Vorlesungen, meistens aber Kurse oder Laborpraktika statt. Die Bibliotheken sind Montags bis Samstags von 8 - 17.30 und von 19 -22 Uhr geöffnet. Sonntags entfallen die Vormittagsöffnungszeiten. Am Nachmittag wird schon wieder für die kommende Woche gearbeitet. Wenn man nach dem Unterricht vor dem Abendessen noch Zeit hat, kann man Sport treiben. Auf dem Universitätsgelände stehen Sportanlagen zur Verfügung: Bälle, Schlittschuhe und viele andere Sportgeräte kann man gegen Vorlage des Studentenausweises kostenlos ausleihen. Man kann diese Zeit auch nutzen um einzukaufen, denn für Schreibmaterial, Waschmittel, Toilettenpapier etc. ist man selbst zuständig. Die männlichen Studenten kaufen sich auch gerne noch Schnellnudeln, die sie sich am Spätabend nach dem Lernen noch als zusätzliche Mahlzeit ohne große Kochkenntnisse zubereiten können.

Das Abendessen beginnt um 18 Uhr und spielt sich fast genauso ab wie das Mittagessen, auch am Abend gibt es wie am Mittag ein warmes Essen, jedoch nicht dasselbe. Ab 19 Uhr kann man in der Bibliothek lernen, wenn man das Glück hatte, in einem der Lesesäle einen Platz zu finden. Sonst muß man in einen der Seminarräume gehen. Die Studentenvereinigung organisiert auch zahlreiche Freizeitveranstaltungen in den Abendstunden. Darunter Filmvorführungen in der Universität oder im Sommer auf dem Sportplatz, sowie Vorträge von Fachleuten, die zumeist von außerhalb der Universität eingeladen werden. Zusätzlich kann man sich auch einer Hobbygruppe anschließen, um für das Studentenorchester oder Theateraufführungen, Chordarbietungen oder traditionelle chinesische Kampfkünste zu üben. Manche Studenten betreiben einen Campussender oder geben eine Studentenzeitung heraus. Die Pekinguniversität besitzt auf ihrem Gelände auch einen sehr schönen Park mit einem See, einer Insel und die Studenten gehen dort sehr gerne spazieren.

Die offizielle Ruhezeit beginnt um 23 Uhr. Zu diesem Zeitpunkt wird in allen Zimmern der Strom abgeschaltet. Alle Aktivitäten wie Musizieren, Kartenspielen sind einzustellen und die Studenten müssen sich schlafen legen. Nach dem Übertritt an das Peking University Medical College (PUMC) beginnt das Studium der eigentlichen medizinischen Fächer.

Der Unterricht wird vorwiegend auf Englisch abgehalten. Das soll sich vorteilhaft auf einen späteren internationalen Austausch auswirken. Aber man muß auch die chinesische Fachsprache lernen. Daher hat man an der PUMC viel weniger Zeit als an der Peking Universität. Es gibt sehr viele unbekannte Begriffe und Termini, die man Wort für Wort in einem Lexikon nachschlagen und dann notieren muß. Ich erinnere mich noch recht gut an den ersten Abend an der PUMC, als wir das offizielle Lehrbuch aus den USA von der Universität bekamen. Wir versuchten den Lehrstoff des vorherigen Tages ganz auf Englisch zu lesen, doch neben den Fachtermini war uns auch selbst das Englisch schwer verständlich. Viele von uns haben bis Mitternacht nur zwei oder drei Seiten geschafft; später brauchten wir dafür viel weniger Zeit. Die Studenten haben dann freiwillig Lerngruppen gebildet, in denen sie zusammen lernten und die neuen Fachtermini austauschten. Auch die Professoren halfen den Studenten, indem sie die wichtigsten Tabellen und Bilder, die sie im Unterricht als Dias vorführten, als Heftchen drucken ließen und verteilten. Auf diese Weise sollten sich die Studenten während der Vorlesungen auf den Inhalt konzentrieren und nicht zuviel Auf-

merksamkeit dadurch verlieren, daß sie sich dauernd englische Wörter notierten.

Das PUMC liegt mitten in der Stadt und besitzt daher keinen Campus. Es gibt weniger Studenten als Professoren und Chefärzte. Der Unterricht findet in einem Seminarraum statt, wo jeder seinen Platz hat. Die Professoren kennen jeden Studenten persönlich. Man sagt uns, das PUMC nehme deswegen so wenig Studenten auf, weil die Ausbildung hier so teuer sei. Jeder erhält kostenlos Original-Lehrbücher aus den USA. Der Anatomie steht für jeweils 4 Studenten eine Leiche zur Verfügung, an der man jederzeit lernen kann, nicht nur während des Unterrichts. In der Histologie bekamen wir ein Stereomikroskop geliehen und alle Präparate durfte man für sich behalten und jederzeit benutzen. In der Physiologie und Pharmakologie gibt es Laborpraktika mit Tierversuchen. Jeweils 2 Studenten bilden eine Arbeitsgruppe und haben die notwendigen Geräte für sich allein. Auch das studentische Leben unterscheidet sich von dem an der Peking Universität. Man hat sehr viel mehr Mitspracherecht bei der Organisation z.B der Wahlfächer und der Freizeitvergnügungen. Auch die Unterbringung ist besser. So gibt es beispielsweise auf dem Flur jeweils ein Telefon, was in China noch keineswegs selbstverständlich ist. Selbst an der Peking Universität hat ein Wohnheim für Hunderte oder gelegentlich mehr als 1000 Studenten nur ein einziges Telefon. Das PUMC besitzt zudem die größte Medizinische Bibliothek Chinas. Diese Tatsache, sowie Vorträge von ausländischen Ärzten und Wissenschaftlern, bietet Studenten die Möglichkeit mehr aufzunehmen, als das eigentliche Medizinstudium ihnen bietet.

Das Ziel des PUMC besteht darin, Mediziner auszubilden, die zugleich Wissenschaftler sind. Der Tagesablauf an der PUMC ähnelt dem an der Peking Universität. Allerdings ist die Zahl der Unterrichtsstunden größer. Montags bis Freitags hat man von 8-12 und von 14-18 Uhr, Samstags bis etwa 16 Uhr Vorlesungen und Laborpraktika. Außer den rein medizinischen Fächern muß man noch Fachenglisch, Alltagsenglisch, Naturdialektik (Marxismus) und Philosophie, hier vor allem traditionelle Chinesiche Philosophie studieren.

Das eigentliche Lernen beginnt erst nach dem Abendessen um 19 Uhr. Man kann in der Bibliothek, in einem Seminarraum oder in einem Raum für Fachpraktika arbeiten, wo unter anderem auch viele dicke Fachbücher zum Nachschlagen erhältlich sind. Auch die Präparate sind zu dieser Zeit zugänglich. Zur Abwechslung gibt es auch einen Zeitungs- oder Zeitschriftenraum, sowie ein Fernsehzimmer. Der Strom wird nicht mehr zentral abgeschaltet und man hat ein wenig mehr Spielraum. Am Samstag Abend wird oft gesungen und getanzt und zu den großen Festtagen, z.B. Nationalfeiertag oder Silvester kommen auch die Professoren manchmal in größerer Anzahl als die Studenten und der Universitätspräsident. Der Sonntag ist der einzige Ruhetag und die Studenten organisieren an diesem Tag gelegentlich gemeinsame Ausflüge.

Wenn die Pathologie und die Pharmakologie abgeschlossen sind, muß man vor Beendigung der vorklinischen Semester eine intensive Forschungsarbeit durchführen. Dies nimmt etwa 20 Wochen, umgerechnet 520 Stunden in Anspruch. Beginnend mit dem vorklinischen Semester werden Prüfungen zumeist in Englisch abgehalten. Reine Multiple Choice Prüfungen gibt es nicht. Die schriftliche Prüfung besteht in der Regel aus verschiedenen Fragen, auf die man manchmal mit regelrechten Aufsätzen antworten muß. Die gesamte Prüfung für ein Fach mit Ausnahme der Philosophie besteht fast immer aus einem schriftlichen und einem praktischen Teil. Beide Teile müssen bestanden werden. Die Note ergibt sich aus beiden Teilnoten. Vor den Abschlußprüfungen der einzelnen Fächer werden kleinere schriftliche und praktische Prüfungen abgehalten, deren Ergebnisse in der Gesamtnote berücksichtigt werden. Während der klinischen Semester findet das Studium fast ausschließlich im Krankenhaus statt. Die insgesamt 30 Studenten je eines Jahrganges werden in 5 bis 6 Gruppen aufgeteilt. Jeder Student hat einen für ihn zuständigen Ausbilder auf der Station, das mag ein Facharzt oder sogar ein Chefarzt sein. Die Hälfte der Zeit nehmen praktische Übungen am Patienten unter der Aufsicht der zuständigen Ärzte in Anspruch. An Wahlfächern, die zwischen 18-36 Stunden zu belegen sind, gibt es zum Beispiel Chinesische Literatur und Informationsverarbeitung, Sozialmedizin, Biophysik sowie biomedizinisches Engineering. Das 8. und letzte Studienjahr, also das Praktische Jahr besteht darin, die Studenten unter der Leitung übergeordneter Ärzte direkt an den diagnostischen und therapeutischen Aufgaben zu beteiligen. Das Praktische Jahr dauert 51 Wochen und die Abschlußprüfungen nehmen eine Woche in Anspruch. Verlangt wird außerdem eine Abschlußarbeit.

3. REPORTS FROM WORKSHOPS

Introduction

K. M. Parry (UK)

It has been our custom in the AMEE meetings to have fairly detailed reports of our workshops, I think one of our most important activities of AMEE meetings have indeed been the workshops where people have got to know each other and to work on common problems. The difficulty is to try to do a resumé of an industrious workshop in a short period and we are delighted to know that Prof. Habeck is going to publish reports from the workshops.

We thought that it would be valuable, however, for everybody to hear what activities were going on in the parallel workshops and we are going to ask the reporters from each of the workshops to give just a brief report with some two or three key points that were discussed in the workshops on Wednesday afternoon and Thursday morning.

Could I ask each of the reporters to come to the platform and give just a short introduction and then we will open the points to general discussion. I may say that I was greatly impressed having a three-page typed report from one of the workshops, which I think is most impressive with modern technology. I wonder if Dr. Wilm would like to introduce this one as an example of a very succinct and clear report of a workshop and open our discussion by presenting your report.

For the reports see session II

Summary of Workshops

K. M. Parry (UK)

One of the things I am not going to do is to summarize eight workshops. I think we will form our own judgements when the reports are received. The English word "science", and sometimes we have been asked what it means, comes from "scienticia", which is knowledge. But I do not think anyone construes science as mere knowledge. It is knowledge which is hard-won and in which we have much more confidence than in opinions and in hear-say beliefs.

I think the workshops showed that they were tackelling how to organize knowledge, and we are going much deeper than the conventional specialties which we have in our profession. We were reminded yesterday that scientific truth has no substansive goal. There is direction only. And there is no final conclusive certainty beyond the reach of criticism. The students and the teachers in the workshops showed us as a profession that we need to come to terms with changes in professional practice partly because of the information explosion and the way it is handled. I think a functional context for an ordered curriculum geared to educational needs is what we should see as an objective of our Conference, and I think we should be grateful to the workshops for setting us in that direction.

4. PLENARY DISCUSSION

Chairs: Prof. M. Garcia Barbero (Spain); Prof. G. Ström (Sweden)

We now have some time for a general discussion, and you are all welcome to participate. Things you might like to comment on are perhaps the usefulness of this Conference and the theme of this Conference. Are you satisfied with scientific thinking as it is? Do you think it is important? Do you think it should be developed, given more emphasis?

You can also perhaps comment on the study groups from yesterday afternoon. In addition to the workshops that we had on Thursday afternoon, there were a number of study groups, all of them based on the so-called standing groups of AMEE. This means that certain parts of medical education are thought of as being of special importance and have gathered deep knowledge and therefore have to specialize. You may like to discuss whether such standing groups are useful and should be continued, or whether you think they are overdoing the whole thing. You may then discuss and comment on anything you like. The floor is open.

Prof. Areskog, (Sweden)

I would like to comment upon the arrangement of the study groups and also make a proposal for next year, when the innovative curricula will be highlighted in Budapest. In regard also to what the students criticised here earlier on, I think firstly that these reports, mostly from students, indeed show that this meeting has not only been a social one. They have worked hard on these different topics and they have made exellent reports and excellent summaries. I think it is a big mistake to think that the AMEE meetings are only the plenary sessions. Since I first took part in the last years of the seventies, the students have criticised the plenary sessions almost every year, because of the lectures and the themes. So the AMEE meetings are definitely not the plenary sessions. There is a lot of work done in other fields besides the nice social things.

Regarding the study groups we had yesterday, there was one group on "Teaching and Learning" with excellent papers, where many of the participants said this should have been in the plenary session because of its general interest. After the coffeeébreak we arranged it that those students who were not used to problem-based learning were able to feel and become acquainted with that type of environment. Perhaps it could be arranged next year that some of the study groups are run in the tutorial way with small groups, where the rules and the procedures of the tutorial are followed. The students and also the teachers could thus be exposed to that type of learning and that type of education. This is then a proposal for next year.

I must say that we tried it in our group and we found it to be successful. We had very good input, both from students and from teachers.

N.N.

I attended that group and had a very nice dicussion, but I would like to make a general remark having attended quite a number of AMEE meetings in the past. There seems to be a tendency in all of us when we meet to compare in a descriptive way the programs that we run in all our countries. We always use quite a lot of time to describe to each other what our systems are like. Now in a way you can say that this is wastes alot of time, because all of us can hopefully read and Gutenberg lived 500 years ago. We could thus perhaps use our time more wisely than by just describing in a very simple way what is going on.

On the other hand, however, and this makes me slightly ambivalent, I think all these very simple descriptions serve as eye-openers to us. We rarely do our homework at home, we start to work on the program as we approach each other

in the Conference, and I think that the descriptive analysis of a program helps people to understand and to listen to each other, to make us understand what our colleagues are like. It also helps to overcome language, social and cultural barriers. So I personally cannot change my mind from the first feeling that this wastes time to still thinking that short descriptions could be helpful. But on the other hand I think that we use far too much time just describing at a very basic level what is going on and that we should try instead to use more of our time to concentrate on extracting the information from that background data. What is relevant, what is important? Why have the systems developed as they have? What can we learn by comparing the systems, instead of just describing the way they are?

Prof. Tysarowski (Poland):

I would like to comment on a general development. For those of you who are not familiar with AMEE-meetings, I would like to mention that we started in Prague with a Pre-Conference about research in medical education in order to introduce more research papers in the field of medical education. What we have seen here now, I think, shows a very big step forward in this development and this is included too that this part of the AMEE Conference is a very important part of the Conference. For example, the first group in which I took part, "Research in Medical Education", had three topics and six presentations of definite research on medical education. All of us who are involved in medical education know the difficulties of research in medical education. But this is leading to the situation that medical education should be based more and more on objective and scientific facts. So this was combined with the main theme "scientific thinking", and it shows that there has been very big progress in the whole development of the AMEE approach, which is finally a professional research association.

Prof. Garcia Barbero (Spain)

The name of our workshop was "The New European Health Policy", not "Health Policy and Medical Education", which can be a completely different topic. It was more about how medical education should be to get to a general objective of a European health policy. We tried to define the new task. All of you you know what the new European health policy means. All the European countries have signed, and we are obliged to get there by the year 2000. So we have to move from a caring system and basically firstly hospital treatment to a more community-orientated profession.

We made a few points regarding what we thought would be those tasks. One of them was managerial and leadership training for future doctors. In the end, if you try to be in charge of a community, you may need some managerial skills. Business schools know very well how to do this. And if the medical schools do not know how to do that they might get professors from other schools to help them, and it is the same with leadership. There are some people who are not born real leaders, but can be in charge of other people if then are trained.

Another thing that is lacking in medical schools are the communication skills. There is a tendency for students to learn all the knowledge in the books by heart without really knowing how to fundamentally communicate with the rest of the community, with other professions or with patients. So you need to have communication skills to do teamwork and to go into the community to practise health education or primary care with a better understanding of what is going on.

The same happened with the psycho-social skills, knowledge of how the community works, and sociology of the community, and not all the countries have the same social background. So you have to be aware of these aspects if you want to be effective in a specific community and change habits for a healthier way of life.

Another important point was that we should interest the students in the cost of health care. With

the increase of very expensive technology, there is a tendency to get all kinds of tests, sometimes very expensive ones, for all sorts of patients. Instead of thinking about what the patients might have and trying to orientate it, we send them to have a scan or all kinds of laboratory tests, without really thinking about the cost of that diagnosis or treatment system.
We thought that all of those are new tasks and new abilities which our students should acquire in order to be more competent doctors for the type of health promotion that we are trying to achieve.

Prof. Menue (WHO/EURO)

Are we not really asking too much from medical students? Are we not aiming at the superperson, trying to get a sort of perfect person? I personally think that is not so, pressure for the physician or the graduate to be a superperson does not really come from the educator or the educational area, but a lot of pressure arises from the society in general: from the patient, from the health organisations, the funding organisations and the other health workers. So there is really pressure for reorganising the work and the function of a physician, not coming theoretically from the education, but from the society in general.

Regarding the question of undergraduate education, it is not necessary to acquire complete skills and competence for full performance of those functions, but it seems that the aim should be to emphasize attitudes more than anything else in key points if we talk about supporting education, and any health policy.

Getting better knowledge and attitudes of getting knowledge in the community and not only of the patient, the families, and environment is not emphasized. Attitudes which are assessing self-assessment or accepting assistance from outside as to their own performance as practicioners. Also attitudes to working with other members of the team who have problems. Problems are not only in the area of only one health worker.

And all these in four roles, which were described very well by Prof. Pauli yesterday in his presentation for promoting and restoring health, which I think was a correct balance of functions.

Darek Gawrowsky, (Poland)

I would like to make a remark regarding pressures on doctors. Society or expectations of patients that a doctor is a person capable to support himself psychologically, socially and to treat his disease. I think it is dishonest and a fault of doctors that we accept this pressure. I think it would make the contact with a patient more honest if we would admit that we are imperfect too that we cannot mangage fully their problems. So in a way we would improve our image more realistically that we cannot sometimes handle all the problems of patients. I think it is a good starting point to admit that we are not omnipotent and it is a mistake to expect doctors or medical students to be so.

5. CLOSING CEREMONY

Prof. Dr. G. Ström (Sweden):

Let me start by saying that the annual conference of AMEE 1989 is over now, that it has been an organisational success and whether the content and the participation has been positive, a success is for all of you to decide on your own. But I would like to formulate the gratitude of the AMEE Executive Commitee Advisory Board and all the members. Our German hosts have been very generous in organizing the meeting and informing us all. The students were admitted free of charge, and you have organized for us social events of great quality and a low price. I hope you will not go bankrupt because of this, but it is important to have a good social background and it is important for us all to meet, to become friends, to exchange experiences, give advice, get impulses for ourselves and to start collaboration between countries. So it is not only the formal program, but it is also the informal part which is of importance as well. So a warm thank you, and will you all join me in applause for our German hosts.

Prof. Dr. Habeck, Münster, FRG:

Mr. President, dear Gunnar, Thank you very much. Now I thank you all for your attendance and I wish also to thank all our co-workers for their organisational and logistical support of this AMEE Conference in Münster, and I thank you especially for too cooperation in preparing this Conference, Gunnar.

Prof. Dr. G. Ström:

Warm thanks to Dietrich Habeck and Fritz Kemper and their co-workers. The AMEE meeting is over!

POSTER

TEN STATEMENTS ON THE MOTIVATION OF MEDICAL TEACHERS TO TEACH

C. Schormair,[1]; U. Swietlik,[2] U. Hofmann,[3]; S. Wilm,[4]; L. Witte,[5]

1. Motivating medical teachers to teach and students to study is an interdependent process. The setting in which medical education takes place in the FRG is regarded as a secondary factor.

Both teachers and students complain about a lack of interest in teaching respectively studying, anonymity due to large numbers of medical students and restrictive regulations. On the other hand, final year students for example, (PJ-Studenten), although assigned to a clinical ward for several months, are seldom competently supervised and trained. The numerical proportion of clinical teachers and students has not substantially declined because the growing number of students has been partially compensated by the enlargement of existing departments and the founding of new institutes.

Discussion on reforms in medical education in the FRG should focus on the interaction between medical teachers and their students.

2. Due to the process of selection and socialisation in the career of becoming a university lecturer, those personalities are favoured who show little motivation to teach.

Large university hospitals and medical faculties are characterized by a complex and peculiar organisation and communication structure and highly specialised, technologically-oriented medical care. Only a selection of graduates accept the challenge, and not all of them are able to withstand the various demands as well as the competitive and research-oriented climate. These processes serve as effective selection and socialisation mechanisms which favour personalities with poor commitment to medical education. Furthermore, successful performance in research is the most important factor in a career. Capable investigators are not necessarily talented instructors.

Professors and assistants interested and qualified in educational matters should be particularly engaged, promoted and given opportunities for further development.

3. The efforts of medical teachers to teach are not adequately rewarded.

The career of qualifying as a university lecturer only depends on research. Engagement and time allocation to student affairs and education are obstacles in persuing this career. Incentives for assistants and professors for their commitment to education matters, such as financial rewards or personal satisfaction for teaching efforts being appreciated by students and colleagues, do not exist at all.

Experience in teaching and didactical-pedagogical training should be a prerequisite for qualifying as a university lecturer as well as for one's appointment to a professorship. Further and differentiated incentives should be created in order to motivate professors and assistants to teach students (eg. Teacher of the Year, student ratings, remuneration).

4. Little didactic competence decreases the teachers' motivation to teach.

Teachers prefer to apply traditional methods of instruction, i.e., the same ones that they were instructed with. Lectures and practical courses are held in an inflexible and uniform way. Consequently, there is not much student participation and the students appear unmotivated. Furthermore, teachers do not get sufficient feedback to realize how their teaching competence has improved.

Professional teacher training should be made available. Institutes for training medical teachers should be established. Physicians involved in medical education should be exempted from their routine and duties and encouraged to participate actively in teacher training.

5. Teacher training and learning processes lack adequate feedback.

The major examinations are organized and conducted by a State Examining Board, thus depriving teachers of direct control of their students' progress. Tests during courses are rarely undertaken or do not focus on relevant items or

practical skills. The prevailing teaching methods (lectures, short practical learning periods) do not allow personal interacton and thus an informal assessment of learning progress. Furthermore, teachers do not seek broad student feedback regarding the quality of instruction and subject matter. Professional evaluation of teaching and learning processes does not exist.

A higher authority for conducting examinations should be delegated to medical faculties. Tests should be regularly performed and the testing methods adapted to the subject matter to be tested (e.g. technical skills, knowledge, problem solving skills such as objectively structured clinical examination, quizzes). Personal and longterm contact between teachers and their students should be favoured. Students should be encouraged to criticize teaching sessions. A professional, independent evaluation of teaching and learning processes by "institutes for didactic in medicine" should be promoted.

6. Mass education and specialisation at medical faculties prevent personal relations. The current educational system causes alienation.

Close personal contact between teacher and student is regarded as a prerequisite for mutual communication and learning from models. Education is characterized by overcrowded lecture theaters, a large number of different classes in clinical and theoretical disciplines and practical courses, as well as frequent rotations within a medical discipline. For the teacher, the generation period of students consists of one or two semesters. In the current educational system, the teacher's task is confined to adding a single, identical "piece of knowledge" - often without any context to clinical practice - for each student. He/she is unable to see the students' development for which he/she is responsible.

The students should be assigned to a teacher as long and closely as possible during the courses. The number of courses and the frequent rotations should be minimized. In addition, a "mentor system" could be established to relieve the anonymous atmosphere at university hospitals. Medical faculties should be made smaller.

7. The medical curriculum has been split up into countless, badly arranged compulsory and optional courses.

Preclinical and clinical studies and the practical year (PJ) are strictly separated. Likewise, the different disciplines (e.g. internal medicine, neurology), subdisciplines (e.g. hematology, nephrology, cardiology) and theoretical subjects (e.g. pharmacology, pathology, statistics) are taught without any coordination. This reflects the increasing disintegration of the faculty into disciplines and subdisciplines.

The design of the medical curriculum has to aim at the horizontal and vertical integration of subjects. The "microsystem teaching" could contribute to prevent the "macrosystem faculty" from further falling apart.

8. Teachers at medical faculties in the FRG are heavily loaded with patient care, research and administration tasks. Their efforts in medical education are thereby impaired.

Teachers are restrained from their commitment to teach by an enormous and steadily growing amount of bureaucracy in patient management, such as scheduling and organizing clinical appointments and investigations, corresponding with insurance companies and the hospital administration, serving on faculty commissions and bodies, or preparing medical opinions. In addition, inefficient organizational structures and the division of labour and outmoded communication systems are time-consuming and stressful. Engagement in research is furthermore the most important factor in one's career.

Medical teachers should be actively relieved by a more efficient organisation and distribution in the division of work (e.g. assisted by ward secretaries, computers). The unity of teaching, research and patient care was a central idea in Humboldt's concept of a university. It ought not to be abandonned. But a more flexible handling according to the interests and time budget of teachers should be achieved (e.g. by periodical exemption from one of these tasks, or being engaged in all fields but putting emphasis on one field according to preference and interests).

9. Federal regulations for licensing physicians (Approbationsordnung) impede a more flexible, innovative organisation of subject matters and application of teaching methods.

Not the faculty, but federal law determines matters such as compulsory courses, the structure of the curriculum, the regulations for conducting examinations (including testing methods and contents). Despite these conditions, a large latitude remains to be fulfilled.

Faculties and their teaching staff should be encouraged to fully utilize the existing latitude and liberty which the current laws and regulations allow. In a medium-range perspective, laws and regulations allowing and promoting educational experiments should be formulated and enacted.

10. Despite disadvantageous conditions, medical education in the FRG could be substantially improved by paying more attention to the competence and commitment of medical teachers.

As stated above, medical education in the FRG is restricted by law, influenced by the high numbers of students and the competitive, anonymous situation at medical faculties where students are educated. But the personality, commitment and qualification of teachers are crucial points in the educational process.

The discussion of reforms in medical education in the FRG should focus on the question of how the motivation and commitment of medical teachers can be promoted.

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BUCHBESPRECHUNG

Prof. Dr. W. Wittkowski
Institut für Anatomie, Universität Münster:

Herbert Lippert: Anatomie am Lebenden. Ein Übungsprogramm für Medizinstudenten. Springer Verlag: Berlin, Heidelberg, New York, London, Paris, Tokyo, Hong Kong 1989. 384 Seiten, 219 Abbildungen, 19 Tabellen. Preis DM 28.-

Das vorliegende Lehrbuch ist aus langjähriger Erfahrung mit "Übungen zur Anatomie am Lebenden", durchgeführt im Rahmen des Anatomieunterrichts in der Vorklinik an der Medizinischen Hochschule Hannover, enstanden. Es behandelt nicht nur die Oberflächenanatomie des menschlichen Körpers, sondern will dem Studenten auch die klinischen Untersuchungsmethoden im Sinne einer Propädeutik der allgemeinen Krankenuntersuchung nahebringen. Damit verknüpft der Autor in beispielhafter Weise vorklinische und klinische Unterrichtsinhalte, ein erklärtes Ziel studienreformerischer Bestrebung.

Der Inhalt ist nach Körperregionen gegliedert und ermöglicht dadurch eine thematische Anlehnung an den Präparierkurs. Der Autor führt den Leser in einer anschaulichen, überaus detailreichen und exakten Beschreibung in die klassischen Untersuchungsmethoden ein und macht dabei eindrucksvoll deutlich, wie unverzichtbar diese "einfachen diagnostischen Verfahren" sind. Neben Inspektion und Palpation gehören Perkussion und Auskultation genauso zum Übungsprogramm wie die Funktionsprüfung. Letztere erstreckt sich auch auf orthopädische und neurologische Untersuchungsmethoden oder bis zur Anleitung für opthalmologische oder audiologische Untersuchungstechniken (Augen-, Ohrenspiegelung). Damit greift das Buch notwendigerweise über die Grenzen der anatomischen Betrachtungsweise hinaus, behandelt die zum Verständnis notwendigen physiologischen Sachverhalte und gibt anschauliche und einprägsame Hinweise auf krankhafte Veränderungen.

Prof. Lippert hat vor ca. 10 Jahren "Übungen zur Anatomie am Lebenden" im vorklinischen Unterricht initiiert und seither mit Erfolg durchgeführt. Da für diese mittlerweile auch an anderen Universitäten eingeführten Veranstaltungen bislang nur Skripten zur Verfügung stehen, ist das Erscheinen des vorliegenden Buches eine große Hilfe für Lehrende wie auch Studierende. Es is so geschrieben, daß jeder Student mit anatomischem Basiswissen den Untersuchungsgang weitesgehend selbständig durchführen kann und dabei ein reiches Hintergrundwissen vermittelt bekommt, welches ihm kein anderes gängiges Buch der klinischen Untersuchungsmethoden zu bieten vermag.

Für die Leser, die wenig Zeit erübrigen können, wäre es allerdings hilfreich, wenn bei einer Überarbeitung die Passagen, die für eine Krankenuntersuchung von besonderer Bedeutung sind, optisch hervorgehoben würden und wenn an einer Stelle das gesamte Untersuchungsprotokoll einer allgemeinen Krankenuntersuchung dargestellt würde.

Das Buch erscheint aus meiner Sicht zu einem außerordentlich günstigen Zeitpunkt: Ausgelöst durch die "siebte Verordnung zur Änderung der Approbationsordnung für Ärzte" ist die Diskussion über eine Umgestaltung des vorklinischen Unterrichts und vor allem die Einführung von Seminaren, die von Vorklinikern und Klinikern gemeinsam gestaltet werden sollen, in vollem Gange. Hier bietet es sich an, die "Anatomie am Lebenden" als Propädeutik der physikalischen Krankenuntersuchung generell in den Unterrichtsplan aufzunehmen und durch Patientenvorstellungen zu ergänzen. Dem Anliegen einer engen Verbindung klinischer und vorklinischer Unterrichtsinhalte wäre damit in idealer Weise Rechnung getragen. Das Buch von Lippert gäbe für ein solches Vorhaben gute Hilfestellung.

Insgesamt handelt es sich um ein außergewöhnliches, mit sehr viel Einfühlungsvermögen geschriebenes Buch, aus dem Lehrende wie Lernende in Vorklinik und Klinik Gewinn ziehen können.

MITTEILUNG/ANNOUNCEMENT

The Annual Conference of the Association for Medical Education in Europa (AMEE) together with the Association of Medical Deans in Europa (AMDE) will take place from Semptember 3-6, 1990 in Budapest. For further information contact:
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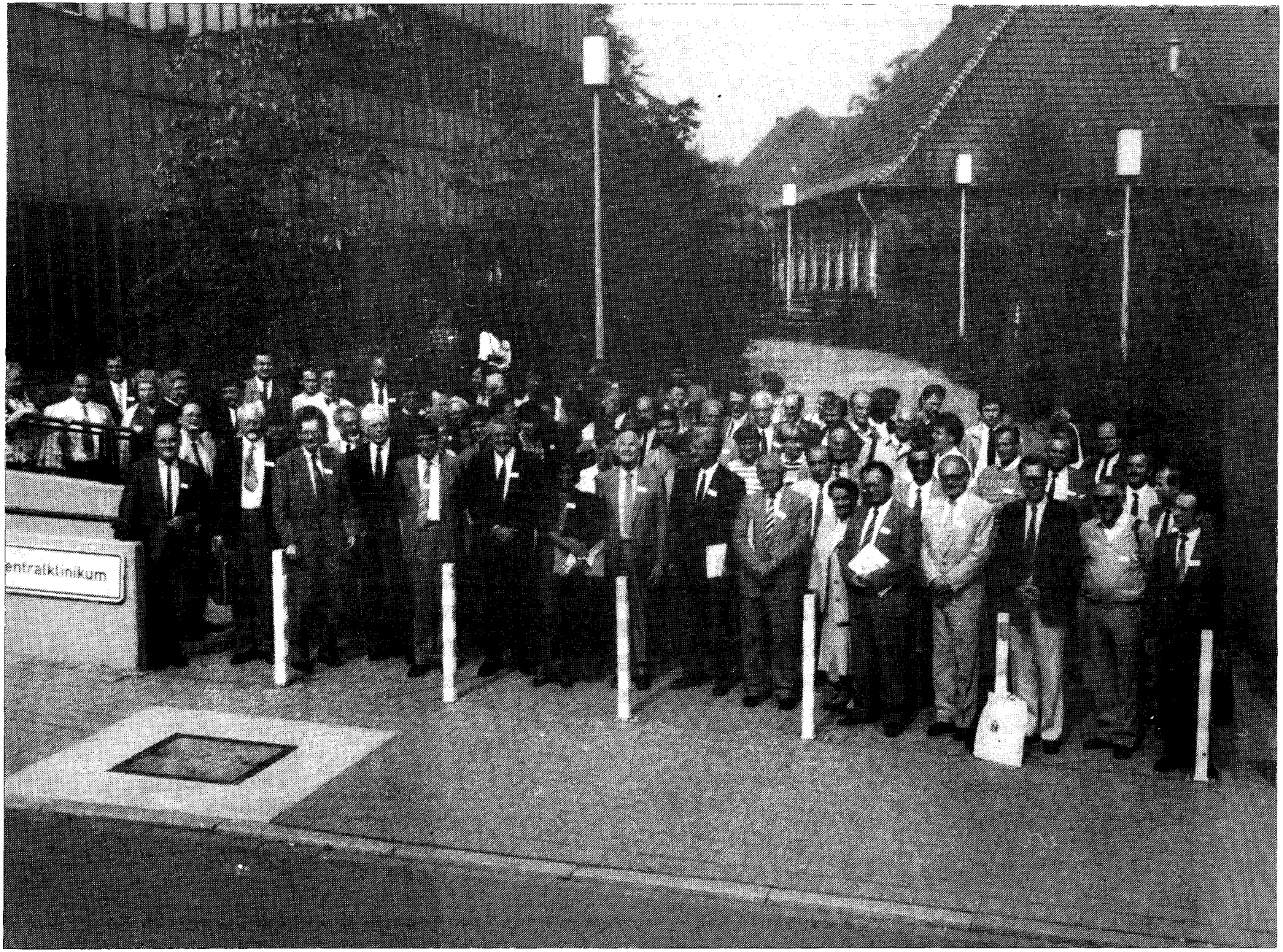
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