

## 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, without 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
literature	20%	18%	16%	36%
people	30%	31%	22%	39%
retrospective	29%	42%	6%	6%
laboratoria	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 fulfil 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.