

## THIS ANACHRONISM, THE LECTURE

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This short discussion is an attempt to point out the weaknesses of the lecture system in pre-clinical medical education, and to present an easily workable alternative. The medical educators have been slow to drop bad ideas in the past. Recall, for example, that biochemistry students of not many years ago were required to make soap in lab, no doubt an experience which greatly enhanced their skill as physicians. It's as if the profession felt it must maintain its tradition of driving its students, and so filled up the hours in medical school with any knowledge that didn't seem to belong anywhere else. As knowledge multiplies, however, the necessity of separating relevant from less important material becomes imperative. Our educational system must become more *efficient* and *effective*. The lecture system is dead weight to a streamlined pre-clinical education.

Three things can be said about the usefulness of lectures: they are, they aren't, or they are sometimes, useful. Since we have all heard good lectures and bad, we can conclude that they are only sometimes useful. When? In the pre-clinical years they are the primary educational medium. Should this practice continue, or should lectures be used only in instances when they are obviously the superior educational method? To decide this, we must determine what sort of knowledge medical students must learn, and then we must decide whether this knowledge is effectively and efficiently conveyed by the lecture system. I shall not deal with the clinical years, because the learning format changes and lectures become less of an occupational hazard.

In the first two years the student has to acquire a basic fund of medical knowledge, i.e. he has to learn and commit to memory a great many facts. There are only three ways the student can be exposed to this knowledge:

he can read it; he can hear it; or he can see it, through media such as patients, slides, and movies. If learning involves reception of material and then mental manipulation of it, the teacher can influence mainly the *receptive* process. This is most effectively done by his setting up the material in as rational a fashion as possible, so that the student can more quickly understand the relations between the facts. Students in the majority are made aware of facts most quickly if they see them, less quickly if they hear them, and least quickly if they read them. The best exposure, of course, is made by simultaneously hearing and seeing, as with a clinician explaining a patient at the bedside.

We can deduce, therefore, that the pre-clinical student would learn his facts most quickly if he could see them all. This ideal situation is obviously impossible. For one thing, many of the facts the student learns are abstract (e.g. acid-base balance). Furthermore, even physical facts couldn't all be presented visually. For example, every disease couldn't be effectively and completely elucidated by a pathological specimen. Finally, movies and slides have their place, but at best act as supplementary visual aids. These deficiencies prevent seeing from being any more than a supplementary learning method. It could never, as lectures do at present, carry the bulk of the educational load. We are left with hearing and reading.

In addition to being the least rapid method of being made aware of facts, reading has the deficiencies inherent in books themselves. Books usually fail to meet some standard, either by being too detailed, or too simplified; too comprehensive or too generalized; out-of-date, poorly written, or lacking in proper or sufficient illustrations or examples. Applying these criteria one is pressed to think of a book which meets the requirements to be ideal. Therefore, besides the fact that students get tired of doing nothing but reading

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books, reading cannot be used as the primary educational medium. Of course we all know its value as a supplementary medium. Occasionally, and unfortunately, for lack of some thing better, it becomes the primary method of exposure to the facts.

The final method of exposure in teaching, hearing, was the original method, i.e. someone telling somebody else. The original idea was for the teacher to relate the facts and then to expound on them with analysis, exploration, interpretation, criticism, and example. All students will attest to the effectiveness of this method if ideally utilized. But we must distinguish *two types* of lectures (for we can use the word lecture now since receiving facts by hearing is the essence of a lecture). *Type one* lectures function in the original sense, where the teacher relates and then expounds on information. In the *second type*, the emphasis is on the relating (telling) of facts, and little time is spent on exposition. The *type* of information related in this second kind of lecture often precludes any subtle exposition. This sort of information can be classified as telephone directory knowledge (TDK), i.e. hearing it is almost synonymous with understanding it. The great bulk of pre-clinical knowledge is TDK. Of course, there are obvious exceptions such as many physiological concepts. By the nature of the bulk of the subject matter, however, the second type of lecture is at present the method of exposure to facts most frequently used in the pre-clinical years i.e. it carries most of the teaching load. But is this method as now used the most effective and efficient one?

To answer this question we must examine the virtues of the lecture system. Firstly, it has already produced a great many excellent doctors, and therefore it works. But this is a far cry from showing it to be the most effective or efficient system. Secondly, teachers in a one-hour lecture can often simplify and organize material on a bulky topic that would require several hours of reading if students covered it independently (i.e. hearing is more efficient than reading as a fact-exposure technique). The lecturer, furthermore, can often include newly discovered data in his notes, and include excerpts from his own experience to add spice to his points. In the context of pre-clinical education, however, these arguments are not very relevant. These lecturers often classify and organize data, but it is an excep-

tional instance when the lecturer's material is more comprehensive or comprehensible than a good text book. Rather than deal with only important material, lecturers more often give students a wealth of minutiae which is never noticed in reading a text, and which is usually not of long-standing importance. The students forget it five minutes after the examination.

The idea that pre-clinical lecturers use their medium to present newly discovered information is generally a misconception. Most lecturers give the same notes year after year with little alteration and often because changes or additions are not needed, since the material is fundamental and well-established (e.g. the Krebs's cycle).

A third argument is favor of the lecture system is the recollection of lectures we have heard by outstanding men. These lectures, however, are memorable because of the personality of the speaker and his presentation, as much as for their factual content. These men are few, moreover, and this paucity prevents their excellence from solving our problem.

Finally, one might argue that perhaps when *all* the variables concerning the teacher-student learning situation which affect efficiency and effectiveness are considered, the lecture system is the best method of exposing students to facts. The variables are those concerning the teacher, the student, the method of reception, and the information being conveyed. Let us examine all these variables to see if they can help us decide the fate of the lecture system.

There are several variables related to teachers. Their numbers, for example, cannot be increased much beyond the present level, due to limiting factors like money for salaries and physical-plant size. This prevents us from increasing the teacher-student ratio, a questionable virtue when dealing with type two lectures anyway, since one teacher can speak to hundreds of students on television, for example.

The ability of teachers to teach obviously varies. But surely, since we are dealing with TDK, anybody can dictate a proper set of notes, regardless of his facility of exposition. The failure of many basic scientists to do this, however, is known to too many medical students. This failure can be due to lack of interest by the professor, inability to present



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the material in a remotely interesting or dynamic fashion, emotional inhibition to speaking, and most often, lack of organization. Therefore, the lecturer, if he can't dictate, is contributing to the ineffectiveness of the system. Or even if he can dictate, he is at best contributing to an inefficient system, since his job could be done as well by inanimate electrical recording systems. He would be better off spending his time in the lab. In inclusion then, the ability of basic scientists to dictate is either a detrimental or harmless variable in lecture systems concerned with TDK.

We must now consider variables related to the student. For one thing, the numbers of students is immaterial in the dictation system, since one man can speak to any number with electrical amplification. The other student variable is intelligence. This cannot concern us, however, because it is a fairly unalterable entity. Variables related to the student, therefore, cannot be changed to improve the lecture system.

The final variable in the lecture system is the method of presentation. With the exception of the occasional movie or slides, however, the lecture is essentially a hearing method of reception by the student, as defined earlier. Therefore some variation of the hearing form of learning is the only variable which we can control to improve, if possible, the student's exposure to the facts.

In addition to its weaknesses mentioned earlier, there are a number of further factors which prevent the lecture system from being an efficient and effective method of fact exposure. The gap between the variable interest of basic scientists in teaching and their preference for the laboratory, a current topic, is probably widening, especially as the emphasis on research intensifies. This division of interest can only be detrimental to the scientist's function as a dictating machine.

Empirical evidence of the failure of the lecture system is found in the dissatisfaction of many students with it. Some lecturers even realize they are dictating machines, for as Dr. D. O. W. Waugh puts it, "the facts go in the student's ear and out his finger-tips" as he records, and no thinking is required.

How then, can the lecture be improved, or replaced?

The seminar system is an alternative which deserves little consideration. This

educational technique lends itself most effectively to the discussion of opinions and ideas. Although it serves the ancillary purpose of allowing students to clear up confusing material, the enthusiasm of the moment dies quickly and the seminar becomes a question period by the teacher in charge. Furthermore, while one student is having a problem clarified, the rest of the group is often wasting their time - they already understand the matter. The seminar, although useful in disciplines where the material is more easily subject to mental manipulation, loses this benefit when one is dealing with the hard-core material of basic science (e.g. the Krebs's cycle is the Krebs's cycle, while there can be many interpretations of a poem in an English seminar). While it may be useful as a clearing-house for some ideas, this system cannot cover, alone, the volume of data of the pre-clinical years. A marriage of the lecture system and the seminar system, small-group teaching, is another alternative. This combination is not very synergistic, however, and combines mainly the weaknesses of both methods, so the problems discussed above regarding both methods are still present.

Another commonly suggested alternative, hand-outs of mimeographed notes, has several advantages over the lecture system. Generally, this method would retain every favorable quality of lectures mentioned above (up-to-date, condensed data) except in the occasional instance where the personality of a superior lecturer would be absent. In addition, the teacher could more easily manipulate his material to make sure it is organized, well-written, explicit, and well illustrated. These qualities couldn't be destroyed by a poor presentation, as often happens in a lecture. The greatest advantage of the system would be the time saved. At Dalhousie, second year students receive Pathology dictation for an annual total of *one-hundred and twenty* hours. To obtain even an elementary grasp of the material the student must later study the notes almost as if he had never before been confronted with the subject matter. Medical educators clamor that students have increasing volumes of knowledge to master, and that they should begin clinical medicine as soon as possible. Given the option, I'm sure any second year student would prefer a hand-out plus clinical experience to an hour's dictation. Of course, teachers would have to exercise

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self-discipline to control the volume of material to roughly equal that which it is possible to give in a one hour lecture. Finally, perhaps in certain courses, text-books of superior quality may eliminate any necessity to make up hand-outs, except for occasional supplementation. In these instances, reading assignments could assist in selecting for the student the important topics.

If students did not take notes each day or two in a subject, however, they might be inclined to under-estimate the volume of the material for which they are responsible. Furthermore, they might lack the self-discipline or experience to cope with, say, four hundred pages of notes handed out the first day of a course. In solution of these problems, and in order to be certain that students learn the required material, I suggest the following system: Lecture notes would be handed out on a weekly or bimonthly basis. Students would present themselves every two weeks for a one hour written review test on the material which they were to learn from the hand-outs of the preceding fortnight. In order to prevent this system from degenerating into the usual exam-cram, pressure-ridden rat-race, however, the mark obtained on these bimonthly tests would not affect the final mark in any way, with two exceptions: the student would be required to pass a minimum of two-thirds of these tests, and he must be present for all but two of them. If these rules were not observed, marks could be deducted from the trimester exam result. The final mark would otherwise be based solely

on the marks obtained on the end-of-term regular examinations. This system would encourage the student to study by the manner to which he is accustomed, (i.e. fear of failure), without putting him under pressure to obtain marks except in the usual end-of-term exams. In order to further reduce the somewhat warped prestige value (sour grapes?) of obtaining a high mark, class results of the bimonthly tests would not be posted. Instead, the student would visit a course advisor every two weeks to discuss academic difficulties, and to receive the result of his test. A final benefit of the system is that it would free the basic scientists of the time-wasting practice of giving dictation.

Although I have chosen the Pathology course as the target of my criticism and suggestions, there is no reason why the subjects of biochemistry, pharmacology, and bacteriology couldn't be dealt with similarly. With modifications the system could be adopted to physiology and microanatomy. These modifications would be beneficial because of the conceptual nature of the former subject, and the pictorial nature of the latter.

I have attempted to analyse the lecture system in the preclinical years in order to present a possible alternative to it. I'm sure many other alternate methods can be suggested. I felt a good part of my time in the first two years, functioning as a tape-recorder, was wasted. How about you? Write to your class president to protest. Change things, and make the democratic system work!

*A physician in a great city seems to be the mere plaything of fortune; his degree of reputation is for the most part totally casual; they that employ him know not his excellence; they that reject him know not his deficiency.*

*- Samuel Johnson*

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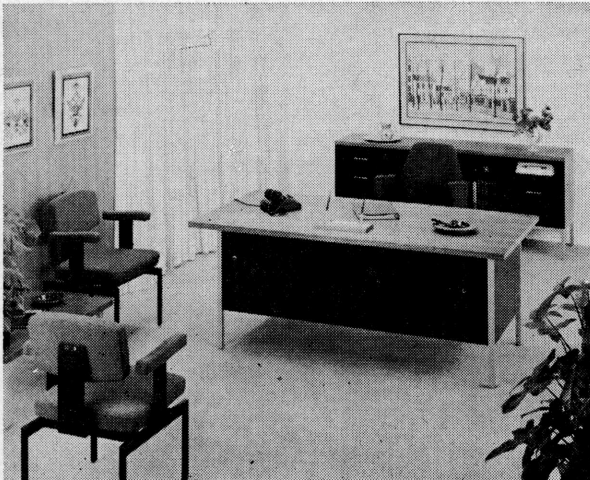


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