Read the first and last paragraphs in the following text.

**What type of student do you have to teach?**

Most lecturers try to help students develop their understanding. But understanding a foreign language is not the same as understanding why someone is upset or understanding electromagnetism or understanding history. It is not to be expected therefore that the same teaching methods will be appropriate to these different kinds of understanding.

Most forms of understanding are expressed by concepts which differ from everyday ones. For example, we all know that suitcases get heavier the longer you carry them, but in science this is described in terms of constant weight plus increasing fatigue. The concept "weight" is introduced and laid alongside the commonsense concept of "heaviness'. Similarly we all know that time passes quickly when we are absorbed and slowly when we are bored, but science tells us that this is an illusion; time really ticks away at a steady rate. Note that conceptual change should not be the aim, as is sometimes suggested, since people still also need their common sense. The aim is to add new sets of concepts and to explain when to use which set.

But "understanding" is not the only kind of learning which students need to master. Instruction, demonstration and error-correction are the key teaching activities - which are quite different from those needed to reach understanding - while practice is the main learning activity.

Students also have to memorise information and be able to recall it when required, as well as acquire several other kinds of learning (such as know-how and attitudes and values) each of which calls for different teaching methods. So learning-centred teaching includes a conscious matching of teaching methods to the intended kind of learning.

While good teaching involves, among other things, helping students to achieve their chosen learning goals, the picture is further complicated by the different learning styles adopted by different groups of students.

Many ways of categorisation and modelling students as learners have been suggested, of which the following are as useful as any, particularly in connection with understanding. (Differences between learners' natural learning styles are not so significant when skills are being taught, since the appropriate style is determined more by the activity involved than by students' natural capabilities.)

Some students are "holists": which means they like to take an overview of a subject first and then fill in the details and concepts in their own way.

Others are "serialists" who like to follow a logical progression of a subject, beginning at the beginning. Educational researcher Gordon Pask structured some teaching materials in both a holist and a serialist manner, and then tested previously-sorted cohorts of students using them. He found that the best performance of those who were mismatched (i.e. holist students with serialist material, and vice versa) was worse than the worst performance of those who were matched to the learning materials.

This seems to imply, for example, that educational textbooks - which are naturally serialist in character - should include signposts, summaries, alternative explanations of difficult concepts, explanatory figure captions, a glossary of terms, a good index, etc, to help holist students find their own way through them. Similarly projects, which are naturally holist in character, since they are usually specified in terms of a final goal, can cause problems for serialists, who may therefore need step-by-step guidance.

Another group of students are "visualisers" whose learning is helped by the inclusion of diagrams, pictures, flow-charts, films, etc. Others are "verbalisers" and prefer to listen, read, discuss, argue, attend tutorials and write during their conceptual development. And some are "doers" and find that overt practical activity is best. The saying that "to hear is to forget, to see is to remember, but to do is to understand" is only true for "doers". With a typical mix of students, attempts should be made to cater for each preferred style.

It is well known nowadays that for the development of "understanding" and for the memorisation of information it is important that students adopt a "deep approach" to their learning, rather than a "surface approach'. The deep approach refers to an intention to develop their understanding and to challenge ideas, while the "surface approach" is the intention to memorise information and to follow instructions. Although students are naturally inclined towards one approach rather than the other - often with a new subject the inclination is towards the surface approach - this can vary from subject to subject and can usually be changed by the teaching they receive. Overloading, for example, will encourage the surface approach; stimulating interest may encourage the deep approach. Given the deep approach, even good lectures can make a considerable contribution to students' "understanding".

Recently the need to encourage the deep approach in students has been allowed to dominate the choice of teaching method, sometimes at the expense of effective teaching. Constructivism in science teaching, for example, in which students are encouraged to devise their own explanations of phenomena, certainly tends to encourage the deep approach, but it can also leave students with misconceptions. Similarly, though problem-based learning is usually popular with students, it teaches "know-how" rather than "understanding": unless explicit conceptual guidance is also given.

The fact that students have different preferred learning styles also has important implications for course evaluation through feedback. It often seems to be assumed that students are a homogeneous bunch and that therefore a majority opinion condemning a certain aspect of a course justifies changing it for the future. But this can well be a mistake. If a course is well matched, say, to "holist verbalisers" it is unlikely to be found very helpful to "serialist visualisers". In other words, feedback is likely to reveal as much about the students as about the course or lecturer, and can be quite misleading unless it is properly analysed in terms of the preferred learning styles of the particular cohort of students.

Indeed, student feedback about the teaching of "understanding" can, in any case, be quite misleading, since students cannot be expected to judge what has been helpful to them until much of the necessary conceptual development has occurred. Only after "the penny has dropped" is such feedback likely to be reliable. Similarly, favourable feedback about the necessary but tedious practising of important "skills" cannot normally be expected.

These considerations are all aspects of learning-centred teaching, with which all lecturers should, in due course, become familiar. Innovation in education without taking these matters into consideration is at best cavalier, at worst irresponsible, for it is the students who suffer from teachers' ill-founded experiments.

(John Sparkes, *Times Higher Education Supplement,* February 6th, 1998)

Notice how reading these sentences gives you a good idea about the meaning of the text. If you need more details, read the text again.