STIMULATING KNOWLEDGE GAINING

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ABSTRACT

The paper gives some ideas for improving traning process and especially the role of stimulanting knowledge gaining. Psychological reation of students is being observed on the background of an illustrational situation created by the author. Special teaching approaches are being suggested bringing to more efficient studing and gaining knowledge.

Sometimes in the course of the lecture the teacher makes the following statement: "....and using the equation of...., it is obvious that...", followed by the question:" What does the equation of...look like?" The question is followed by silence. The lecturer is sure that the equation has been studied by the students in former semester. Nevertheless, students behave as if they have never heard of it! The next step of the lecturer depends on his style and mood that very day. Some of the students would make an attempt to remember and for instance, one of them would say that he has heard of it. The students would be "threatened" by test or the lecturer would start explaining the equation. At last they would remember that in fact they have been studing it.

The situation described brings up some interesting problems concerning efficient teaching and efficient knowledge obtaining. One of our targets is to help students to obtain sound knowledge and to help them in self- educating. They should be able to do the following:

- to work out a plan for studing;
- to define the necessary information;
- to realize the plan for studing;
- to apply the obtained knowledge and skills.

Most of the teachers at the university have aquired these habits and skills in the process of their scientific and research work. Most of our students go directly to practice and their abilities for self- education are slightly developed. We will disuss some of the reasons bringing to that.

CONTEXT

Why don't the students remember the formerly studied equation? We suppose that the students have even passed a test on it. In this case we should study some possible reasons for the situation. The first reason is the context it which the equation has been lectured. If it is an abstract term given without any examples some of the students thought that it was of no importance to be remembered. Investigations in the field of mnemotechnics prove that a certain fact can be accepted by long- term memory more readily in case it is connected with a definite subject or feeling of the individ. That explains the fact that laboratory studies and their application in theory are of great importance to reminding them

POSSESSION

Students study an equation when they solve a problem. Usually in technical sciences education is devided into logical chapters. Outside the framework of these chapters the teacher can freely choose the examples, the test questions and the teaching methods. If he has not chosen the right approach to the students no doubt they would have no interest to study. They simply say:" I am studing that subject as I am obliged to do that. Otherwise, I am not going to next course." This kind of behavior is not popular with the mature students who show more interest in studing knowledge esteemed at the moment of its acception can be more easily reminded.

STAGES OF KNOWLEDGE

Gaining new knowledge goes through three stages. First, students prefer new knowledge in a certain area. Second, knowledge is accepted (understood). Third after some practice knowledge can be reproduced. These three stages are necessary for long- term reminding of information for further use.

INDICATION (CLASSIFICATION)

It is possible that an equation has been called "secondary" by the former teacher and in this way the students know the equation but not it is indication. When a man learns some term for the first time he can usually explain it by the same indications he has been described. After getting closer to the term he can leave these indications and explain it in plain words. This process takes time and experience which students do not have.

DEGREE OF MATURENESS

Students learning changes coustantly with time. When students first enter the university the teacher is considered to be the source of knowledge. So the teacher is an important sourse of authority and is responsible for giving the student the right knowledge. That is why they think that the former and the present teacher are responsible for "the right answer". But they do not see that the equation is a prove of their "bad" behaviour. In this case teacher's question to the students is much more a test for degree of intelligence. As mature lecturers with professional practice we can remember simular feeling but with the years we gained more self- confidence. We should also add that students medium also influences on its participation in lectures. Upper cources react in a completely different way to teacher's questions. They answer reading to them being quite communicative as opposed to the starting students.

Going back to the equation, how can we provoke a more positive reation in the students? To begin with the lesson when it has been explained for the first time. According to Knefelkamp new knowledge is learned better when using the principle from "practice to theory" and then again to "practice". Knowledge is first represented by experience. It is used as a basis of theory and then practice is used for confirming the same theory and using it in other areas. The first thing the student should understand is that "he will need the suggested knowledge". It is important to reach that idea by himself. In this way theory helps to explain practical activity. In fact practice outlines the structure of theory for easier reminding.

Distinctive events also have special signifficance in remembering knowledge. For instance, an experiment, a demonstration, a laboratory exercise or a project requiring. Sometimes this experience gives the connection between the new knowledge and the old experience using analogues. The lecturer himself is not able to produce such a distinctive event as it is in fact the reaction of the student to a certain activity. In spite of it he may produce an act having the qualities of distinction. Such activities can appear simultaneously. They can also be programmed with the aim of increasing the potential of future knowledge reminding. These activities are interesting, to stimulate discussious amoug students.

Research learning exceeds in all cases linear education. A typical situation is when the lecturer explains theory to give examples concerning its application in practice. But it is also a fact that students usually learn the formular ignoring theory. Sometimes technical education is considered an accumulation of

formular applied to specifical situations rather than a practice for application of main scientific principles to new situations. It is good that students should not solve the problem using the principles formular but start with the principles on which it is based. Learning by "selfknowing" is another positive factor for remembering. It is a worldwide fact that the necessary knowledge for an engineer has greatly increased but the time for obtaining that knowledge is the same. So, students should get greater control on learning process. The individual studing of students is an activity that can be used for developing self- detedmining learning. It helps them to obtain knowledge without the "authority" of the teacher.

Improvement of information is another requirement in teaching. Sometimes students become dependent by teachers's way of giving them the relavant information. Of course, a good textbook is very useful but it should not limitate the students to search for new sources of information. Textbooks model the so called linear education. As opposed to them students should use their own sources of information, including, consultants, journals, texts, computer networks etc. Oral and written reproduction in engineering education brings several problems. Studies show that written work is an efficient exercise for intellectual development. When using the model "preffer, learn, reproduce" the process of oral presentation requires to reproduce a theory and to apply it in practice. Teaching is one of the most efficient ways of learning. If students are told to represent a subject in classes, that will help them to learn and memorize it. Different groups of students may be given simular tasks and the result will be positive. That will also help them to develop their abilities and self- confidence in making oral presentations finding new ways of learning.

Investigations show that writing is a better exercise for developing one's intellect. Nevertheless, both- oral and writing presentations are good enough. Sometimes teachers are little bit lazy about checking up written homeworks. That takes much time. But we can make the students do it by delegating them the task to check up the homeworks of their colleagues. The teacher can only correct some of the marks.

And now let us come back to the questions "What is the equation of...?" There are several positive apporoaches the lecturer can use. Firstly, to give a list of terms and equations at the beginning of the semester studied by the students in former courses with the aim of reminding. Secondary, after putting the question the lecturer describes the equation or writes it on the blackboard. When he next asks if the students have met it they will feel that the teacher in only interested in their knowledge and is not tring to offfend them or define them as "good" or "bad" students.

It is useful to have in mind the way we can put that question to our university colleagues. We are much more tolerant to them not showing the element of superiority which sometimes we show to students. The target of the teacher is to cultivate mature behaviour in students so that they could develop abilities and skills necessary for self- determining learning.

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PROBLEMS AND SPECIFIC TASKS IN CREATING SYSTEMS FOR EDUCATIONAL QUALITY IN ELECTRICAL ENGINEERING SUBJECTS

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ABSTRACT

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The training process in the area of the Electrical Engineering has some specific features. Neither the electric current nor the magnetic flux can be touched and seen directly. New materials and technologies are rapidly introduced and implemented. The students have to build their own and specific understanding for both static and dynamic electrical phenomena.

The delivery of the theoretical material recently becomes a challenge for the lecturers. Together with the classical fundamentals they have to introduce new discoveries which grow up in a rapid way. For the practical training in the Labs new models of modem and sophisticated electrical equipment have also to be constantly introduced. In this paper the idea expressed by the authors is that good quality and positive final results can be obtained only by creating teams of lecturers and research workers with good synchronization among them concerning the philosophy and goals of the course.

The authors experience of many years has been shared in the paper, analyzing the teaching process in the field of Electrical engineering both in MGU "St Ivan Rilski" and Technical University of Sofia.

Not only the lecture structuring is concerned but also the course project developing and the laboratory exercises organization and conduction. It is strongly recommended to minimize the number of the students in a group to the lower possible level. The test protocols shall also be prepared immediately in the Lab, according to the view point of the authors, while the computer modeling and simulation shall be considered only as an additional part of the overall task.

The results of the student's opinion inquiry are also provided and analyzed. The authors experience clearly shows that it is likely to obtain reliable feedback information only after careful questionnaire preparation, taking into account subjective, emotional and other factors. Example of such questionnaire is provided. Still it is not clear how to create criteria for a good quality of the teaching process and how to compare the competence level of two or more lecturers, delivering similar lecture material even in one and the same Faculty.