Generating learning through self-teaching and alternative strategies

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***Abstract**: A great percentage of the public education institutions at different levels, follows a paradigm based in a traditional model, in which the teacher, owner of the science, takes the active part in the transmission of knowledge, leaving the student the function of a receptor. This pattern has prevailed, thus neglecting the student's potential and, on the other hand, improvements in education and in the transmission of knowledge.*
The first terms of the following binomials: student-teacher, formation-information, learning-teaching, activity-passivity, predominate, without any doubt, over the second. Thus, the classroom may not be the only place where the students can learn.
In the educational process, emphasis should be put in the acquisition of an integral formation, which will be more consistent for the student and independent of the passage of time. The learning-teaching process should consist of an experience leading the student to involve the best of his abilities and aptitudes to learn. He should not only get a good command of his specific discipline, but also obtain other important benefits, not directly related with his career, that could influence significantly his scholar and social life, and his success as a professional.
Within this abilities, the following ones should be mentioned: learning to learn itself, which involves self-teaching; ability to propose and solve problems; team work; organization of time and activities; development of responsibilities, independence, etc.

In the case of the Division of Basic Sciences and Engineering of the Universidad Autónoma Metropolitana, Campus Azcapotzalco, an analysis was made, processing data such as: admission, desertion and failure indexes and the results of inquiries and interviews. This leads to the conclusion that the student failure, his overall period in the University, and the deficiencies in learning, are due to the following factors, among others:

- The study is motivated by accreditation rather than by learning and formation.
- The pupil studies superficially, confining his learning within the lowest levels: information and comprehension.
- The student cannot apply skillfully the concepts of: self-learning, information search, team work and cooperative learning.
- The teacher ignores strategies that could help his students to improve the quality of learning.
- In public education institutions, resources are generally not available or not enough to develop related programs.

Except for the latter, problems can be solved with creativity and will from students and teachers and with institutional support.
It's necessary to generate, inside and outside the classroom, a different dynamics to promote a change. Students and teachers should modify their performances in order to get more efficient learning, with enough impact on the main objective of the educational institutions: Integral education.

Introduction

In different Latin American countries, the financial situation of public universities, is not good enough to introduce, as a generalized practice, the use of advanced media for teaching, such as audiovisual and electronic equipment, experimental kits for laboratories, multimedia and even the use of modern technological information systems, such as Internet. These tools are helpful to develop cognitive and sensorial ability of the students in order to acquire better learning. Due to this lack of resources, public universities
should accept the challenge of searching for alternative ways, strategies and methods, in order to make the student achieve a better quality of learning with the available resources.
Apart form that, an important percentage of public education institutions at any level, follow a paradigm based in a traditional model, in which the teacher appears as the owner and commands the knowledge, while the student becomes the receptor. This model neglects the student' skills and the advances in education and learning techniques.
In higher education institutions, it is generally accepted that the second term of the following formulas and more important than the first one: formation-information, learning-teaching, student-teacher. It is necessary to

reconsider this situation and give them a fair assessment.

An idea must prevail, that the educator should provide the pupil a comprehensive education; it's necessary to eliminate the concept of education as a simple transfer of information, because in itself it's a very limited and poor point of view.

Thus, regarding the formula formation-information, the school should be a place where the essential aim should be to *educate the student comprehensively*, as already mentioned. It is no longer enough to give them specific information; rather, it's absolutely necessary to consider every contribution that can help in the student's development as a human being. Human, physical and intellectual education are altogether very important; they should, in short, provide the individual with the possibility of sharing experiences and work with different people or groups of people. It's hardly effective for anybody to be an expert in a branch of the science if he has no ability to relate and work with others.

The educational point of view should consider the teaching-learning process as an opportunity for the institution and for the teacher to transfer, inside the classroom, not only disciplinary knowledge, but also to strengthen and develop in the student all sort of abilities attitudes and values.

With regard to learning, it is necessary to accept it as more important than, or at least, as important as teaching, for it is the essential object of the educative process.

When the traditional model is considered and we think about the teaching-learning process in the classroom, the teacher keeps a more important roll. He's the one who speaks, conducts, acts and exercises, often without regarding that the student is who will learn. Thus, this model where the teacher takes the active roll and the student the passive roll, has shown again and again its inefficacy.

The student should be accepted as the center and object of the action, capable of showing attitudes and doing positive things for his own learning. In this alternative model, the teacher should advise the student and help him to find his way; he should become a guide in the student's educative process.

In the Division of Basic Sciences and Engineering of the Universidad Autónoma Metropolitana Azcapotzalco, an analysis was made after gathering pertinent statistical information, such as indexes of: graduation, accreditation, desertion and overall staying period in the university as well as inquiries applied to groups of students and opinions of the members of the community. As a conclusion it was necessary to admit serious deficiencies. Students' failure, long overall periods and deficient quality in learning are due to the following causes:

- Students are concerned by accreditation rather than by learning.
- They study in a superficial way; their level should be placed within the lowest ones of the cognitive scale: information and understanding. That's why complaints, when they pass from one course to another, are quite usual.
- Students cannot manage to apply learning techniques and strategies, such as: self-teaching, the search for information or team work.
- Teachers generally do not know or care about how to help their students to improve the quality of their learning.
- Facilities and equipment are neither modern nor sufficient.

Characteristics of learning

Regarding this point, it is important to make clear what is the meaning of *quality of learning*. Learning is achieved when the student is capable of transcending the time and context in which it was acquired; it means that he's capable of extrapolating it to different contexts and of applying it, together with other knowledge, to solve problems or specific situations.

Elements of learning (learning level, opportunity, pertinence and amount) are described as follows:

1. Learning level

Different authors suggest that learning reaches different levels, depending on the person's depth of reasoning and ability for its management. The following are considered:

Information

This is the lowest level in the action of learning. The student only knows the existence of a situation, fact or phenomenon. For instance, he's aware that there is something known as *Energy Conservation Law* or he can read superficially about an historical event, such as the *Industrial Revolution*, but in this first approach he ignores the principles and details that explain those subjects.

The student reaches this level when the teacher begins the explanation of a subject, or when he attends a conference, or when he reads an article or a book but does not perform an analysis of details.

Understanding

This second level entails an effective approach to specific details of a subject, event or phenomenon. This level is acquired through the student's work; it's not enough with a deep exposition from the teacher; the student will achieve this level only by investing time to the purpose and working.

Thus, it happens that even when the pupil attends all his classes from the beginning and

pays due attention, his learning will remain superficial. He will only reach superior levels if he develops self-teaching, a subject to be introduced later in this paper.

Application
Analysis / Synthesis
Assessment

These three learning levels are achieved when the student conforms a command of the subject or discipline. They are more permanent learning levels. When the student manages them, he will hardly forget what he has learnt and it will be relatively easy for him to search and apply information from other sources.

Changing from one learning level to another means: time, effort, perseverance and adequate strategies. As a result of his own work, he will be a beginner or perhaps an expert in the subject. The first of these qualifications means a very limited management of the situation, whereas the second means that he will find options, new answers and new ideas through his abilities for analysis, synthesis, criticism and assessment.

2. Opportunity / Pertinence

Knowledge, in order to be useful and profitable, has to be pertinent, opportune and gradual, according to the educative level. It has to be offered to the student in the adequate moment or phase of his career, considering the subject and the interaction with others.

For instance, when an academic program is discussed and proposed, it is necessary to consider requisites, antecedents and consequents, as a result of a serious and thorough analysis.

3. Amount

It's necessary to think about the amount of knowledge received by the student along his educative process. He's a receptor of classes, conferences, readings, experiences in laboratories, etc. But, how much of this has resulted in an effective learning? Frequently, studies and analysis reveal that results are poor.

The fact is that most of the student's learning remains within the two lowest levels: information and understanding. His objective is generally the accreditation, which grants him the possibility of registering for other courses in order to complete, as economically as possible, the end of his career. However, he shouldn't forget that knowledge is a sort of construction, and he will often need to come back to previous learning.

This is the reason why certain schools have designed introductory or leveling courses in order to provide the students with the knowledge they need for the studies he has chosen.

Independently of the subject or level, what those courses look for is that the student *learns more*; more learning does not necessary mean learning more things but getting a more permanent form of learning; that's why it is necessary to select the fundamentals and to have a chance of learning these subjects in a proper way.

The experience at UAM

In the Universidad Autónoma Metropolitana there is, since the beginning, an alternative to the traditional system, called Individualized Learning System (SAI, for its initials in Spanish). This system is based on the principle of personalized instruction.

In the SAI, the student's activity is decisive and his learning level is determined. It aims to be an excellence system because the teacher guides, advises and helps the student through his learning process and periodical exams help to verify the student's progress.

The SAI offers the students the following advantages:

- To study and to learn step by step, regarding the basic philosophy of the system, dividing the subject into small portions (this helps the student to study gradually)
- To program an adequate distribution of time and activities (promoting self organization)
- To program exam dates according to the student's advance (promoting responsibility)
- To explore the student's abilities to face the challenge of learning by himself (promoting self confidence)
- Evaluation is more comprehensive (direct communication between teacher and student helps the former to make a fair assessment of the latter's learning)

When comparisons between the SAI's student and those who follow the traditional system are made, it is noticed that the former obtain better results with regard to the learning level; additionally they acquire profitable study habits, they organize better their time and get something very important, the habit of facing the study as a continuous exercise and not as a previous-to-exam activity.

Despite its design, it has been also proved that SAI is a good opportunity to profit from the proximity and identification student-student and to promote cooperative learning. The teacher looks for the more advanced students and tries to make them help those who have problems or deficiencies.

Conclusions

The educative stress should be put in the acquisition of a comprehensive education, which should be more consistent for the student despite the passage of time.

The teaching-learning process must become an experience to lead the student to make use and strengthen his abilities and skills in order to obtain, not only the command of a specific discipline, as it happens in the best of cases, but also to reach a thorough education: intellectual, human, physical and social.

Intellectual education should mean the capacity of learning to learn by itself, the capacity of self-teaching, the ability to propose and solve problems through cognitive operations such as abstraction, analysis, synthesis and not only by the use of memory.

The student should understand that learning is not simply the direct result of his presence in the classroom; he should know that learning is the result of a personal effort that involves: time dedicated to search information, study of concepts and resolution of problems with increasing degree of difficulty, in order to develop gradually abilities for abstraction, analysis, synthesis and integration.

It is important to promote a more active roll for the pupil in the classroom. The notes he writes during the class should be considered as a simple guide, for he should assume his duty of searching further information and get involved in a process of self-teaching.

It is necessary to explore, inside and outside the classroom a different dynamics, a change in the attitudes and rolls of teacher and students, transcendent enough for the educative objective of the institutions: comprehensive education; not only learning things but also learning to apply them and to relate them with other subjects; acquiring profitable abilities and attitudes and strengthening the fundamental human values.

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