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للأستاذ الدكتور محمد عبد الفتاح شامة

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by

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REGIONAL WORKSHOP ON NEW APPROACHES
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THE ROLE OF STAFF DEVELOPMENT IN THE PROMOTION OF ENGINEERING EDUCATION

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ABSTRACT:

Due to the advent of modern technologies in all aspects of human life and the ever growing scientific and technological advances, a huge burden is added to the process of educating and preparing the engineer of the future. Undergraduate engineering education can no more provide the graduates with adequate knowledge to sustain them for a good portion of their subsequent professional life. Therefore, it is becoming more necessary for engineering education institutions to continuously modify and improve the teaching material and continuously upgrade the means of presenting it. In a highly competitive environment, those institutions which cannot comply with the new national and international requirements and standards of education will either be forced out or their graduates will find no place in the work market.

The multidimensional task of: a) keeping-up with the state-of-the-art of scientific and technological advances, b) meeting the ever changing environmental demands and societal requirements, c) developing, executing and updating educational programs, d) maintaining and improving the educational facilities, is carried out by the staff members of each institution. Therefore, it is crucial to design and implement staff development programs with the aim of preparing those involved in the engineering education process to comply with the above mentioned tasks and continuously providing them with the new knowledge and the means to efficiently perform their duties. In summary, the road for improving engineering education starts from the adequate preparation and updating of faculty staff members to cope with the ever increasing demands required from them.

INTRODUCTION:

Advanced modern technology has become an integral part in all aspects of human life. It is expected from the engineering profession to play a leading role in the introduction, application and development of technologically based solutions for our every-day problems [1]. Therefore, it is the task of engineering educational institutions to provide the necessary personnel to perform these duties. This necessitates that these institutions continuously review and upgrade their educational programs to graduate engineers not only mastering current technologies but also capable of contributing in their development [2].

The subject of the development of engineering education is a major concern to engineering institutions in most countries of the world regardless of the level of their technological advancement. In the last few years, many national and international activities dealing with this subject took place. In November 1994, the Third World Congress in Engineering Education and Training was held in Cairo. Many presentations reflected the new trend of the adoption of Total Quality Management "TQM" into educational institutions [3,4]. This concept, initially adopted successfully in industry, showed to have great potentials in other fields of activities.

Total Quality Education "TQE":

The development of engineering education cannot take place successfully without taking into consideration all relevant factors affecting the education process [5]. The adoption of TQM leads to viewing the engineering education as a production process in which:

1- the educational institute takes the role of an industrial or service enterprise,
2- the students and the society problems represent the raw materials,
3- the engineering graduates and research are the final products,
4- the institute facilities are the machines while the staff members are the tools,
5- the continuing education and the education development are the maintenance for both the product and the enterprise.

Therefore, the management of the education process becomes the heart of the process success, and it requires the following:

1- setting goals and objectives: these must be clear, reachable, feasible, etc.
2- evaluation of stages and participants in the process: the evaluation process must be simple, flexible, periodic, etc.

3- taking action after evaluation: this must be positive, encouraging, not threatening, etc.

TQE at the Faculty of Engineering, Alexandria University:

The need for the development of graduate and undergraduate programs at the Faculty of Engineering, Alex. Univ. has long been recognized by its staff members. In addition to that, the adoption of the semester system in the Egyptian higher education necessitated a new approach in performing such development. A working team of staff members at the faculty is carrying out a comprehensive study for searching and developing the means and ways to successfully adopt TQE in the engineering education process. An integrated education model has been proposed to indicate the major external elements interacting with and affecting the education process [6]. A simplified version of the model is shown in Figure 1. Needless to say, any of these external factors can have a great impact on the quality of the education process. Therefore, it is crucial when planning for any educational development program to take into consideration the respective influences of the these factors. The proposed model then proceeds in analyzing the different internal elements influencing the education process within the engineering education institutions itself. Figure 2 summarizes these elements. In a comprehensive program, each of these elements must have its own share of development, otherwise, it can hinder the whole process. Based on this study, the faculty council agreed to form an education development committee with a goal of planning and supervising all development programs.

Staff Development Programs:

No doubt that the faculty staff members bear the major responsibilities in the education process and its development. It is now becoming recognized that their adequate preparation to perform their duties and their continuous upgrading is a vital element in this process. Staff development programs have been implemented in many universities. Regional and international networks have been established to exchange information and experiences in this regard. The Arab Network for Staff Development "ANSD" is the one responsible for promoting this idea among Arab Universities.

If we concentrate on planning for a development program for staff members in the faculties of engineering in particular, we have first to identify their areas of responsibilities and activities. Figure 3 presents a comprehensive model of engineering

staff development aspects. It comprises the major fields of development and upgrading the performance and needs of staff members during their active professional life. If we scrutinize currently adopted development programs existing in most universities, we can recognize that, unfortunately, most of these programs, if they exist, concentrate only on imparting skills to the staff members. They fail to recognize the multidimensional role he is expected to play during his career. He is left to acquire whatever skills he can in other areas through personnel motivation and experience. However, one should admit that the major role currently played by the engineering staff member is teaching. Mastering a certain field in science is necessary but not sufficient for a good "University Staff Member". Teaching itself is a skill that staff members have to be taught how to properly perform. In this regard, figure 4 gives a model for staff development in teaching. It is equally important for a staff member to keep up with the new trends and technologies used in teaching particularly special field of interest.

Having presented the multiple tasks required from a staff member, he finally needs to be familiar with the principles of time management. The time allocated to each of these tasks differs as the staff member is promoted in his career. In general, with time, administrative loads increase while his teaching and research activities decrease. With proper time management and creative development programs, the active age span of the staff member can be optimized.

RECOMMENDATIONS:

1- Initiating staff development programs in other areas of activities of engineering staff members.
2- Study of optimal load distribution of engineering staff members taking into consideration activities other than teaching and research.
3- Creating models for staff development compatible with the various engineering disciplines.
4- Review of the educational process for the various disciplines of the engineering profession every three years to accommodate new developments and technologies.

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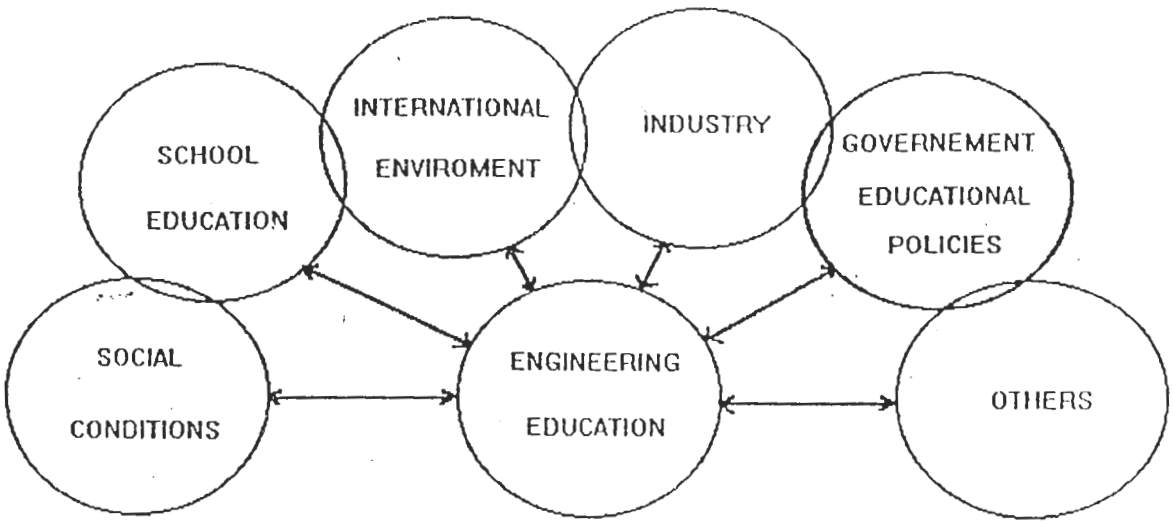

FIG 1 SIMPLIFIED INTEGRATED ENGINEERING EDUCATION MODEL.

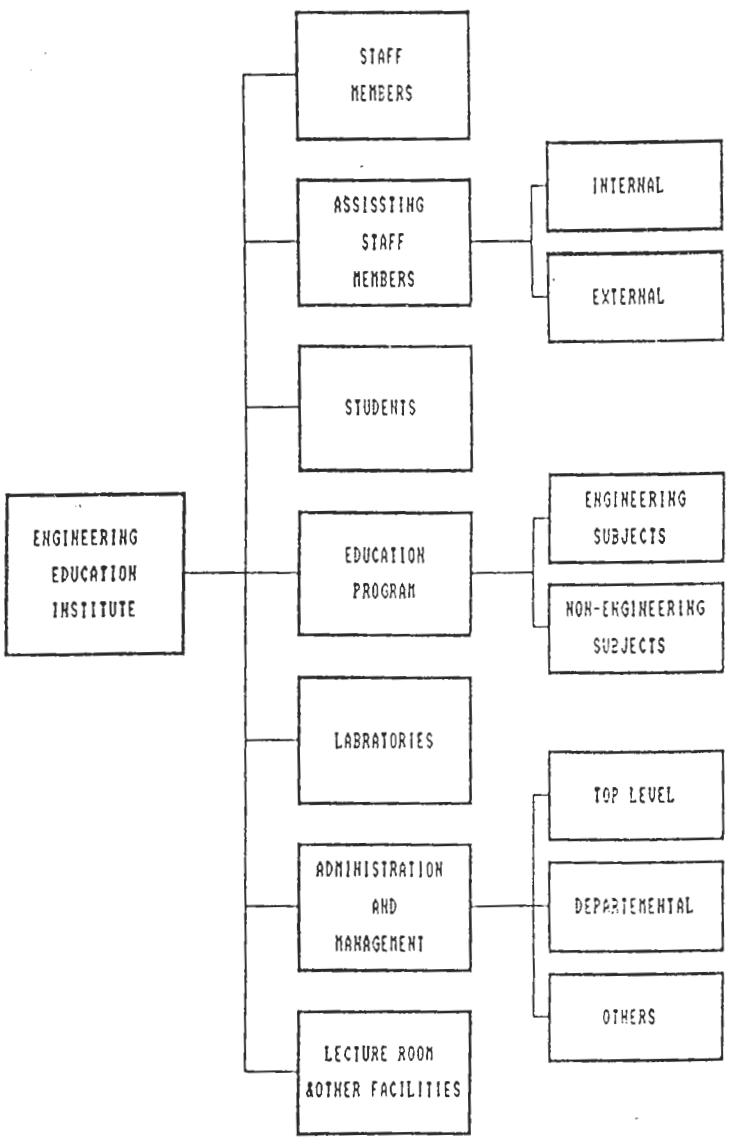

FIG 2 MODEL OF ENGINEERING EDUCATION WITHEN THE INSTITUTE

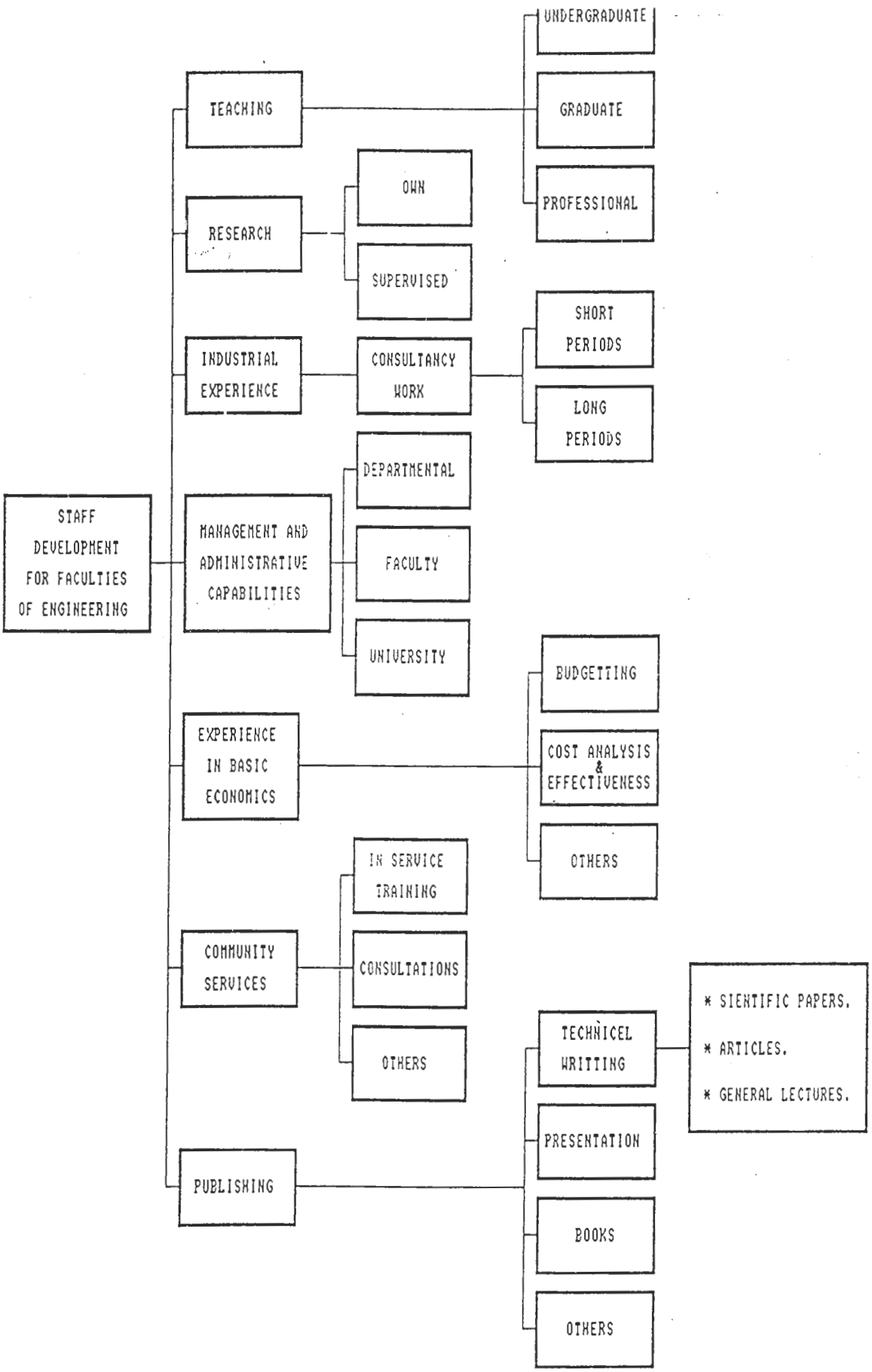

FIG 3 MODEL OF STAFF DEVELOPMENT ASPECTS

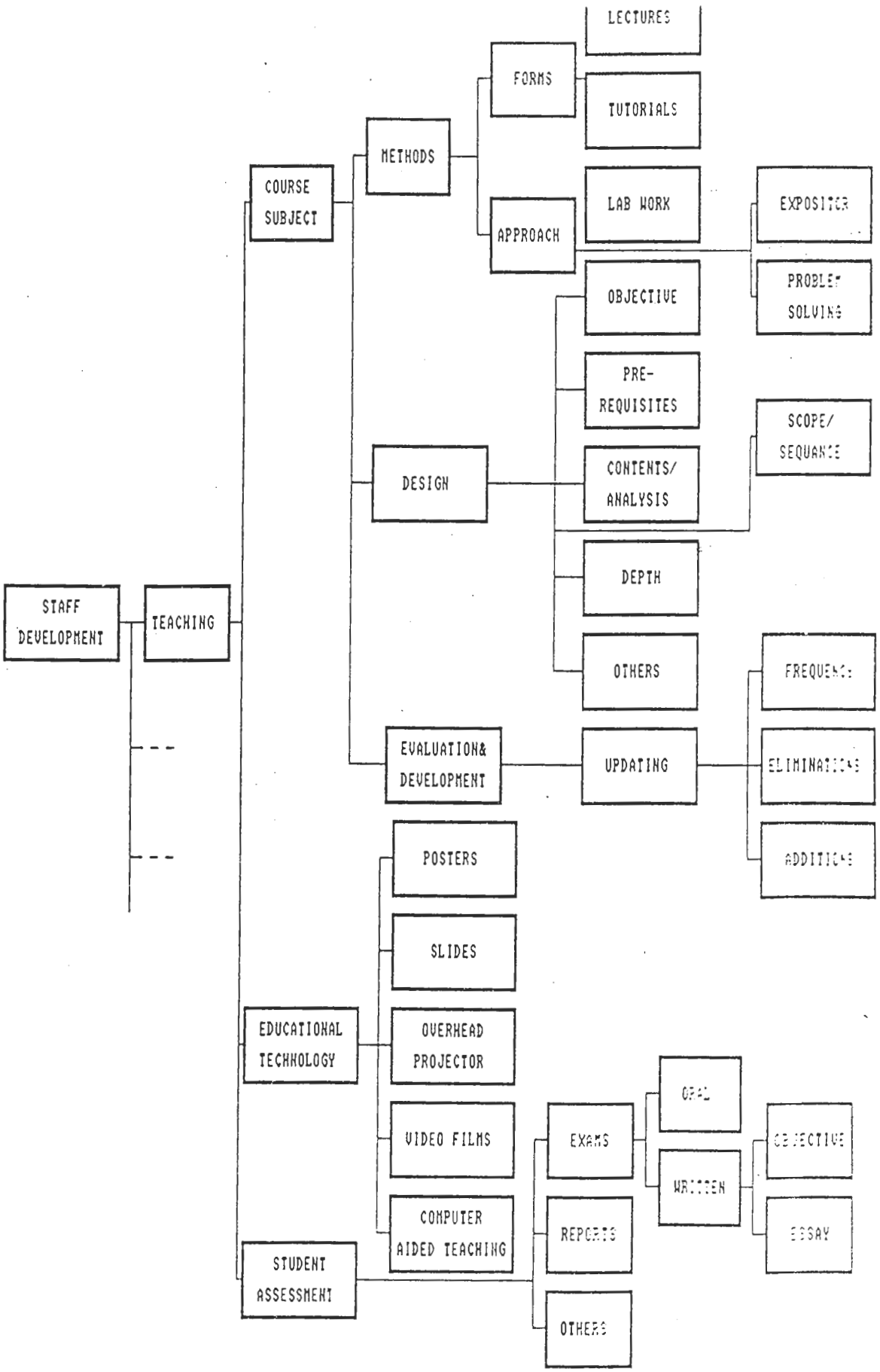

FIG 4 MODEL OF STAFF DEVELOPMENT IN TEACHING