HIGHER TECHNICAL EDUCATION RESEARCH VS EDUCATION

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Abstract: Finding low levels of knowledge of the graduates of the last decade and the state of the research - seen through the results, the staff employed and financial efforts - but this raises questions, and not fewer. In this paper, theoretical analysis will be even more fundamentally, the two essential tasks, which are widely assigned to higher technical education: education and research. The confusion should disappear completely and the selection of future research among future engineers should be continuous throughout the regular studies and after a unitary procedure which have the basic competency criteria rigorously defined.

1. INTRODUCTION

Education is an area whose activities shall ensure the acquisition of knowledge, developing skills and abilities, so that it can access and facilitate inter-human communication - verbal or written - highly intelligible and consistency necessary for perpetuation of heritage and cultural progress of humanity.

Particularly, higher education is meant to deepen their knowledge and develop creativity, without which the continuous progress of humankind would not be possible.

Reserved for higher education and technical sciences has as main goal the improved knowledge of natural phenomena, explanation, discovery and application of laws governing the existence of beings and things in the universe.

There is nothing new or contradictory to be noted in previous brief expressions. Finding low levels of knowledge - and not just specialty - the graduates of the last decade, and the state of the research - seen through the results, the staff employed and financial efforts - but raises questions, not fewer.

To answer to some of these questions, it have to be done a phenomenon study to identify the laws - if they exist - their experimental verification and then applying them with optimized parameters so that to overcome the existing impasse and the collapse shadow to be removed completely.

Such research is not in the possible scale of one man. It is rather a task-ranking government, being executed by a highly specialized agency, but with a fair overall view of society as a whole. In this paper, theoretical analysis will be even more fundamentally, the two essential tasks, which are widely assigned to higher technical education: education and research.

Why focus on the technical higher education? Because it is widely known that science is a strong driving force for the progress of a country and humankind as a whole. That is why it is an important task for any government, to find the best ways and means to support the science's development which alone can ensure a country's progress. It is mentioned in this parable philosopher Bacon, in which science is opposed to empiricism: "crippled to limping on the right path may exceed the athlete who runs the wrong way. Moreover, as the latter runs faster, it will leave more crippled at the end ".

2. THE COMPONENT OF TEACHING IN UNIVERSITIES

Training in universities is through the classical complex of activities: teaching – seminars - practical work - evaluation. How changed the weights of these activities in the

past 20 years, bachelor, masters respectively, is shown in Figure 1 and 2. Each component has particular embodiments, from university to university and from teacher to teacher, depending on the local, domain, tradition, customs, equipment and individual skills of the owner. Although it should be analyzed in detail, each component part, we will only work on issues relevant for the topic as it is defined through its title:

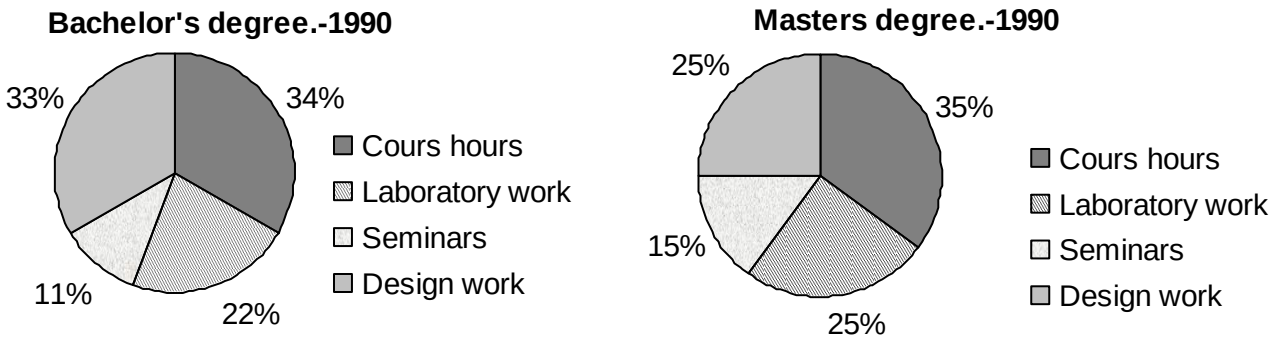

Figure 1. Distribution of training activities in 1990

With regard to the teaching activity - No matter how and the technique is used for presentation, the fundamental and basic knowledge transmitted is shrinking opposing the examples, be they real or virtual. That is reflected negative on graduate scientific training. Can the graduate become an encyclopedia of "what is" but with insufficient knowledge about "why and how to do" and completely unprepared for creative work in the field.

With regard to the seminars activity - these activities is used mainly in non-technical subjects and is usually an extension of the course and not debate it or settles a so-called individual work completed with a report, most often, a copy of material already posted on the Internet. Also, the number of hours allocated to this activity has decreased dramatically in the last 20 years.

With regard to the practical-work and design activity - These activities are designed to secure knowledge and to create skills for student, including the creative and research. The number of hours the design fell by a share of over 30% during undergraduate studies and over 50% in masters studies in the past 20 years (see figure 1 and 2). The result can only be negative for the scientific quality of graduates.

With regard to activities of evaluation - Also, and this component has undergone major changes and not always in a good way. The examination has become predominant and often written based on multiple-choice questionnaire. Although in this way simplifies the evaluation work, it does not encourage learning activity, competition, desire to be among the best and neithero creativity. Most often encourages superficiality, copying and "guessing" answers. In addition, the teacher has no opportunity to assess student knowledge and skills and no certainty that can correctly classify them according to their actual performance.

Moreover, indiscriminately use of IT in teaching techniques (projection file doc, pdf, ppt, pps, etc.) and consolidation of knowledge (CAD-CAM design, experiments and even machining which are virtual simulated), and brought along positive effects, also, proven negative results. They were noted for both basic science disciplines and belonging to the basic technical and practical. As an example we mention only precarious knowledge of drawing and machine parts of graduates [3], which entails difficulties in understanding the

upstream technical disciplines such as: machine tools, devices, cutting tools, manufacturing technology etc. and even student unable to execute himself technical project, the more inventive one, regardless of the field.

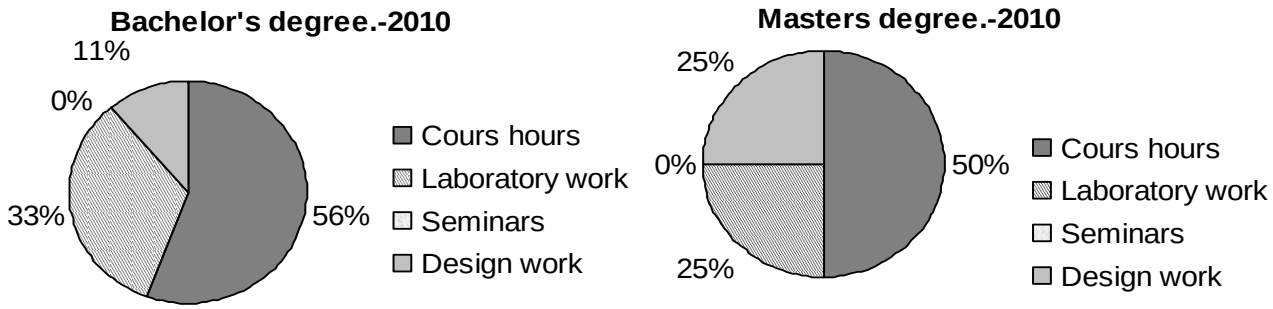

Figure 2. Distribution of training activities in 2010

IT techniques are just an aid, not an alternative. Teaching in the traditional oral way is irreplaceable! A true teacher or scientist, teaches himself when explaining students. On the other hand, trying to explain issues clearly and concisely, he checks his own knowledge, reworded, students answer questions, clarify and classify, in a continuous creative manner. It thus creates the premise that students will be able to know better than their teacher education discipline - it is actually true progress.

When not communicating with combative, contradictory or not the research areas is the "fashionable" way, is sure sign that the university feels hint of old age or sclerosis [1].

Direct teacher-student contact is crucial. Only when hear the man and eventually see his facial expressions and his workplace or laboratory, occurs confidence to his knowledge and work. For the same reasons, no book, IT files or movie, cannot replace the teacher! Regarding the presentation of the course, Rutherford said: "As little slide! Whenever the light goes out, some other listeners leaving the room ..."

3. THE COMPONENT OF RESEARCH IN UNIVERSITIES

Fundamental research is to investigate the basic phenomena, whose power is necessary to deepen knowledge about the nature. Its task is to provide the knowledge required by the need to transform nature in support of civilized humankind.

Regarding the training of young researchers - Like 40 years ago, the management of higher education institutions remained in the hands of teachers, the formation mostly scholastic, for which research work is not a defining part of their work. Their requirements to the students, their education system are not usually oriented towards highlighting young talented and with creative power. Paradoxically, although master studies would be to prepare students for future doctoral research work, among the subjects studied there was not one which will reveal the mysteries of research.

Therefore higher education institutions in Romania today, cannot develop creative skills. Attending examination, are found mainly, university professors do not appreciate the student who mostly "understand" but the student who, above all "know", when in fact, science needs people who, above all "understand". Hence, the selection of graduates in employment after the exams notes is very risky. This was felt by big companies who transferred this task to a service or a recruiting firm specializing in through evaluation and job placements.

Regarding the selection of young researchers - In Romania today, selecting - like training - of scientific staff is left to the institutes of higher education, where only to the end of their studies, based on skills, but particularly on the marks obtained, most suitable graduates are selected for this type of activity and directed to doctoral studies. Only here they come into contact with scientific work and only now can they put out any creative possibilities - over 23 years, so with a delay of 4 or 5 years from when the experts say that talent is recognizable. On the other hand, higher education institutes have only a very small measure of teachers who are at the same time researchers in the true sense of the quantum to be lived for and research work done by all the rules of this job. Experience shows that a regular teacher is not necessarily equipped with the skills of the evaluator and teacher of creative characteristics of students. Moreover, and worse for educating young people for science based subjects are not taught at the appropriate level. In the past, this task was entrusted to the best and most experienced teachers, today covering positions by other criteria, or even in their absence, and training is the so-called modern technology to "break the link between teacher and student and favors absenteeism or sleeping in the projection rooms - better than in an well-lit amphitheater "[2].

4. CONCLUDING REMARKS

Topics covered only a very small fraction of those that raises serious issues of analysis and the cropped arguments are the result of coercion related to the paper template imposed and not lack of consistence of the documentation. As such, the shown should be considered as an invitation to debate, in order to find solutions to counteract the existing shortcomings and improve the training activities of specialists, both for research and engineering.

Harmonious development of the theory and practice proves to be imperative for any nature knowledge domain. Each generalization towards theory must necessarily be verified experimentally. Without quality equipment, we cannot build a good theory and cannot get valuable practical results. The high level of research is a prerequisite for healthy development of any science. To get access to such a goal requires researchers, both fundamental and the experimental field, and in the same degree in engineering specialists are needed who understand the researcher's results and to highlight the practical applications.

To these issues should be given importance, at least fair if not increased, and this because, in addition, lack of young scientists brings decreasing fast progress, both at the level of the teacher and at the level of experimented scientist or engineer from industry. Moreover, there are still people who believe that any scientific work must have a direct technique consequence. They are those who confuse research work with engineer work, fundamental research with productive engineering. This confusion should disappear completely and the selection of future research among future engineers should be continuous throughout the regular studies and after a unitary procedure which have the basic competency criteria rigorously defined.

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