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Peer Visit to Faculty of Technology and Metallurgy

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PROF DR STEFAN DUKIANDJIEV (TEMPUS OFFICE, SERBIA AND MONTENEGRO)

Preface

In the framework of the Austrian Project "Support for Higher Education at the Ss. Cyril and Methodius University" (thereafter referred to as "the University" or "UKIM"), sponsored by the Austrian Ministry of Foreign Affairs, peer visits to 6 Faculties (selected by the UKIM leadership) took place on 21-22 October 2003. These peer visits had been requested by the project coordinator at UKIM, and took place in combination with the complex external evaluation of the Faculties executed by three Macedonian experts. The visits benefited greatly by the comprehensive self-assessment reports produced by the Faculties, which were made available to the international visitors beforehand.

The primary purpose of these visits was to provide an independent outside opinion by international experts regarding the quality assurance (QA) and institutional assessment provisions that have been introduced into the higher education system of the Republic of Macedonia in the course of the last year. Moreover, a focus on the theme of Study Programmes had been chosen by UKIM.

"Evaluation is to determine the significance or worth of something by careful appraisal and study ... it is a developmental process that illuminates or enlightens the specific policies, processes and practice of its stakeholders and contributes to collective learning" (CERN - Capitalisation and Evaluation Research Network). Thus, rather than "examining" these UKIM Faculties, the international experts engaged in fruitful, profound and mutually beneficial exchange of experiences and ideas. The accumulated and horizontal findings of the international experts from Austria, Bulgaria, Croatia, Germany, and Serbia during their visits to the Faculties of Architecture, Civil Engineering, Economics, Technology and Metallurgy, Mining and Geology, and Philosophy will be contained in a Comprehensive Opinion paper, to be produced under the project. Selected horizontal findings are attached to this report as well.

The preface and the annex are common to all 6 reports, the main text is written by the visiting expert.



Introductory Notes and Background Information

This report is related to the side evaluation visit that I have made within the program of the Austrian Ministry of Foreign Affairs "Support for the Higher Education at the Cyril and Methodius University of Skopje" (UKIM) project. The visit was part of the activities related to the Quality Assurance Component of the project.

The choice of the Faculty of Technology and Metallurgy (FTM) faculty is linked to my basic university education (Chemistry) and my current academic involvement in Biotechnology. The visit was carried out as a joint action with 3 colleagues professors, representatives of the National Evaluation Agency: Prof. Bozin Donevski, University of Bitola, Deputy Head of the Agency, Prof. Margita Kon-Popovska, Faculty of Natural Science and Mathematic, UKIM, and Prof. Ljupco Panovski, Faculty of Electrical Engineering, UKIM.

FTM is one of the 24 faculties of UKIM. Teaching activities in Technology and Metallurgy were first organized by the Technology Department (1959), within the then-Technical Faculty. The faculty as such was set up on 1965. Following the expansion of the chemical and metal industries in Macedonia, two separate faculties (of Technology and of Metallurgy) were created on 1976. A whole-university effort to rationalise the curricula (1984) resulted in the reintegration of the two faculties.

In 1999 the FTM undertook a serious action to adapt its teaching better to the gradually (mostly unfavourable) changes of the social economic environment. All study programmes have been reorganized. New study programmes on Biotechnology, Ready-made Engineering and Design and Management in Chemical Industry were created.

According to the programme of the visit (annexed), we had meetings and discussions with the representatives of the main groups/categories of the Faculty - the Dean authority, the senior teachers, the assistants and the students. The program included a meeting with the Commission for the self-evaluation. Provided the short time of the visit (one day), the project coordination committee decided to give priority to the subjects related to the Faculty curricula and their provision.

The visit was organized well thank to the preparatory process and documents by the project consortium and the UKIM management. However, the main merit goes to the Faculty. The Dean's authority created an open, constructive and good-will atmosphere. The faculty colleagues were receiving me not as an external evaluator, but rather as a welcome colleague, who came to understand the situation, to see the positive and negative side of the management and the teaching, and to share his honest observations. Honestly speaking, I even felt some expectation and preparedness that this visit may trigger beneficial activities beyond the formal visit as an external evaluator. All this facilitated my task and at the same time made it more responsible. Finally, we had a real joint exercise. We have accomplished our program correctly. There is a real chance that the hidden and the concrete results, including this report will be used in the right way for further improvement of the Faculty of Technology and Metallurgy.



Mission and Profile of the FTM

Observations

The Faculty assumes well its place and role as a constitutive part of the UKIM and as an autonomous institution. The statement about the mission of the faculty is presented in the Self-evaluation report (2002) and included also in the Catalogue for the FTM (2002). The main objectives are focused on the assurance of relevant study programmes and their appropriate provision for the students. The faculty sees its responsibility in developing additional skills to students, enabling them to face better the challenges of the changing social economic environment. At the same time, the mission statement does not clearly position the Faculty with regard to the other stakeholders – state, state and private enterprises, local community, etc.

The Faculty's profile is very broad. It was following the gradual expansion of the technology industry of Macedonia and the need to prepare the needed specialists. The programs are covering many and quite different subject areas: from Inorganic and Organic Chemistry Technology, through the Textile Engineering and Ready-made Engineering and Metallurgy, to Food Technology and Biotechnology. The decline of some industries and the overall changes of the socio-economic environment is a real challenge for the Faculty in re-adjusting its mission and profile. The two Metallurgy Institutes, and to lesser extent, the Institutes of Textile Engineering and Organic and Inorganic Technology are more affected. The Dean and the majority of academics are well aware about the need to redesign the Faculty profile and the study programmes – up to considering to reduce the heterogeneity of the Faculty.

Challenges and Recommendations

1. FTM to develop further its positive initiative to undertake a new cycle of revision of the structure of the Faculty and the study programs;
2. The revision may go up to the reduction of the number of Institutes.

Additional Suggestions

1. To develop information and training offers and activities for the teachers and for the students about the responsibilities and concrete obligations linked to the involvement of the Faculty in the Bologna process, and to put the realization of these principles at the center of the Faculty policy and strategy;
2. To use the good relationship with industry and other stakeholder and to involve them in the planned revision;
3. The new Commission set up by the Faculty Senate could be given an even stronger mandate and assistance in order to address more substantially these issues.

Structure and Provision of the Study Programs

Observations

Currently the Faculty's 6 Institutes are providing 9 undergraduate study programmes. The last substantial revision of the UGSP took place in 1999. These SPs are complying with the 2000 Higher Education Act, calling for international compatibility and introducing the dimensions of quality assessment and accreditation. The colleagues

Tel/Fax: +43-1-945-6558
 Mobile: +43-699-1945-6558
 Email: office@navreme.net
 Website: www.navreme.net

Registration: FN 205174 b (Vienna Commercial Court)
 UID: ATU51288609
 Bank account: 000 0203 9591 at Erste Bank (BLZ 20111)
 IBAN / BIC: AT43 2011 1000 0203 9591 / GIBAATWW



assured me that this was possible, because the 2000 Act was in discussion for many years and the Faculties and the academics knew its major terms before it was adopted.

Most of the UGSPs are important and relevant, and through their provision the Faculty contributes to the realization of the overall mission of the UKIM to meet the country's needs for graduate specialists in technology. The faculty maintains good relations with its partners from industry, both for assuring the compatibility of the programmes and for the insurance of adequate practical placement for students.

The duration of the UGSPs is 9 semesters - 8 teaching and one (the last) for preparation of diploma thesis. The SER does not address this issue, and during the discussions I perceived there is not enough justification about the need of having this diploma thesis at the under graduate level. On top of this, due to the weak facilities and material supply, it is difficult to see how all the students can prepare good theses.

The real duration of the UGS in the FTM is much longer, up to 7-8 years. For a long period this was seen as normal. Now, however, everybody is aware of the gravity of the problem of a too long study duration, and gradually an understanding evolves that this fact is of direct connection with the structure of the study programmes and the quality of their provision.

All UGSPs have a common first year. Some of the programmes have very similar (up to 80%) second year programmes, and a good number of common subjects in the third year. The Dean's office, the Evaluation commission, and the teachers expressed a readiness to look for further rationalization of the SPs through the extension of their common and complementary parts, despite the heterogeneity of the Faculty. This will provide a better basis for internal horizontal mobility of the students. The Faculty staff is aware of the necessity to reduce the heterogeneity of Study Programmes.

The character, the content and the provision of the UGSPs is addressed adequately during the self evaluation and the findings are well presented in the report. The SWOT analysis reveals the main positive and negative sides, and proposes important opportunities and a concrete Action plan for their realization.

Moreover, the SAR does not address the issue of the duration of individual courses. Some of them are unjustified from a contemporary position, i.e. a too long duration of two semesters. The number of all subjects in the SP is 43 and more! The students have more than 10 exams per year. The majority of subjects are 3+3 hours per week (45+45 per semester). Even during the 3rd and 4th year, the week workload is above 30 h/week, not including the extra auditorium works.

The Faculty provides a (too) large number (13) of Postgraduate or Master programmes. These Master programmes are presented in the Students' Guideline, which enables students to make their choice in the early stage of their undergraduate studies. Also the structure, the content and the provision of the master programmes are not assessed as well as the UGSPs during the Self-assessment. Consequently, no SWOT analysis is presented and neither an action plan is proposed.



The 4 semesters PGSPs include only a small number of new subjects. The main part of the workload is devoted to the preparation of the Master thesis. The majority of the Master students (90%) are finalizing their studies by preparing an experimental diploma thesis, and 10% with finish with a composition. This issue is a subject of reconsideration in order to meet these two opposed moments - I saw some understanding from the colleagues on this issue.

The current Master programmes are designed exclusively for the graduates of the same faculty and they are not attractive for other faculties' students. To improve this, more subjects should be included, what will provide other students opportunity to create enough new knowledge and to address relevant diploma thesis subjects.

Formally all relevant faculty groups are involved in the discussions related to the curricula development. My first observations are that this is more true for the representatives of these groups in the Faculty bodies - but not for the majority of them. Students are not well prepared to analyze the strong and weak part of the SP, especially the new role of the Bachelor and Master programs. Even if this is understandable, I think that we have to teach students also to get more experience in this regard, in order to be able to approach these issues from a better informed position.

The problems related to the poor material facilities for modern content and provision of the SPs was the priority issue for discussion with all groups, including the students. The faculty and the academics are struggling for ensuring the practical part of the curricula, and this is recognized as the biggest problem both in the SAR and within the discussions. This problem affects also the opportunity for good quality Master theses.

The provision of the SPs is carried out in a rather traditional method of one-way (frontal) lecturing. According to the students, there are no factors motivating the teachers to improve their teaching. A number of subjects last two semesters - with all problems associated with it. There is a (to-be-strengthened) trend to update the provision of teaching by extension of interactive methods and increasing the seminar-type exercises. The problem stays as for the minimum modernization of the practical part.

Examination is of big importance provided the big number of exams and overloaded subjects. The examination definitely has its influence on the low success rate of the students, and the high number of the drop-out students, respectively. Starting last academic year, the Faculty introduced a new examination approach and procedure, including mid-term examinations. The first results are extremely positive – a dramatic reduction of the drop-outs.

Challenges and Recommendations

1. The Faculty should realise the evolving consensus for shortening the UGSP (at least) to 4 years (8 semesters), and by increasing the number of optional and elective courses;
2. To discuss the division of the UGSPs in two groups and to increase the common parts of the obligatory courses within each of these groups;



3. To continue and to broaden the implementation of the new examination procedure;
4. To reduce the number of the Master programs;
5. To group some of the current Master programs and to have a reasonable minimum of students in order to rationalize the structure and the teaching process;
6. To include more subjects into Master programs in order to ensure new round-up knowledge and skills for students.

Additional Suggestions

1. It is a timely and important to organize discussions on the relevance of asking students to prepare diploma theses for getting their first (Bachelor) diploma;
2. To proceed with the in-depth analysis of the high drop-outs problem, and to discriminate the internal causes (quality of the curricula and the methods of provision) from the external (social-political) causes;
3. To consider the development of joint Master programs with other Faculties and (national and international) universities;
4. Delegating of responsibility for the poor stage of the practical part of the teaching is not constructive. The financial provision will not improve in the coming years, whereas the Faculty should find solutions today.

Faculty Policy and Actions Related to QA

Observations

The FTM has been always open for self analysis and restructuring, due to its complexity and dependence on the changing economic environment - the last substantial restructuring of the SPs and the development of new ones in 1999 is the proof thereof. The leading aims were the modernization of the curricula in considering the European programmes, introduction of new courses corresponding better to the market, inclusion of eligible courses, and opportunities for self-determination for students.

The Faculty is reconsidering its approach to these major issues as a necessity to start the implementation of the Bologna principles. On its own initiative, the faculty set up a Commission which will review the current structure of the faculty and the SPs and propose a plan for revision and redefinition.

The new Faculty management and the Faculty Senate have been taking seriously the other major Bologna issue calling for the establishment of a QA system, compatible with European standards. The Faculty endorsed the UKIM strategy and programme for SA. A positive approach is also applied to the external evaluation of the Faculty. The Faculty has proceeded with a comprehensive self-evaluation - the merit for its quality goes to the Faculty as a whole. Still, my observation underlines the positive role of the commission for self-evaluation. The majority of academics and students were also actively engaged. The Faculty Commission was working in close coordination with the Evaluation Agency.



As a result, the self-evaluation report presented to the Faculty Senate was one comprehensive analysis of the all major activities of the FTM. I got convincing information that the Faculty Senate discussions on the SER were serious. Its acceptance was not a formal vote, but rather a decision for the implementation of the proposed plans for action and improvement. There are already a number of positive results as a follow-up of the Self assessment:

- The strong devotion to QA issues by the majority of staff promoted positive personal changes in the Faculty;
- The Faculty set up a special Commission with a task and mandate to prepare and propose a project for redefining the SPs;
- A serious effort was devoted to rationalize students' examinations;
- The high drop-outs rate of students is considered an important problem and measures are envisaged in this regard;
- Growing motivation to shorten the formal and the real duration of the undergraduate and postgraduate studies;
- The Faculty is searching a procedure for a real involvement of the students in the permanent evaluation and improvement of the quality. There is a decision for regular (annual) examination of student opinions.

The Faculty addresses positively and with openness the undergoing external evaluation. The Macedonian external experts noted that some of their recommendations of the previous external visit are already considered:

- Selection of new Associate Professors (4 new Associate Professors);
- Strict application of the rules for retirement in order to free positions for young teaching staff;
- Recruitment of young teachers - 5 new assistants for the first time in many years.

The commission for SE and the academics are collaborating with the external experts in revealing a correct picture of the Faculty, and the identification of basic weak elements of the Faculty. The same was the approach for our visit. The Faculty was prepared, ready to collaborate and to discuss all problems and difficulties in a transparent manner.

There is a need to design a follow up process and to improve the feedback information to all Faculty groups and especially to students.

International Relations are considered by the Faculty as an important instrument for overall improvement of management and teaching. Under the Tempus programme, the Faculty was involved in 3 Joint European Projects. Two new SPs - on Biotechnology and on Material Science - were designed, and a Center for Technology Transfer was created. The new equipment in the faculty is purchased exclusively within these Tempus projects. The main task now is to find a way to maintain the built partnerships, and to continue the exchange of teachers and students. This should be focused more on the issues related to the Master programs, which become more and more international.



Challenges and Recommendations

1. To build on the well initiated actions related to the establishment of a Quality Assurance system;
2. To establish a coordination between the Commission for Self evaluation and the Commission for the revision of the structure and study programs;
3. Assisting the Commission for self evaluation in upgrading the plan for the next three years of its mandate;
4. All these should be instrumental for the main task of developing a Credit Transfer System;

Additional Suggestions

1. To create a permanent system for follow-up of the realization of the Self assessment report action plans;
2. To study the experience of other Faculties and universities in Self assessment and developing a QA culture;
3. It is advisable to think about some joint actions (e.g. preparation of QA related projects) with the Tempus partner institutions or other universities.

Faculty Policy for Further Improvement

Observations

The Faculty is considering the Study Programmes revised in 1999 (mostly the undergraduate) compatible with the international. For this reason during the Self Assessment the focus was more on their provision and less on their structure and content. However, gradually a new consensus has been evolving on the necessity to:

- To reduce the number of the Institutes;
- To reduce the number of the UGSPs;
- To shorten the formal duration of the SPs from 9 to 8 semesters;
- To improve the ratio between the compulsory and eligible subjects;
- To increase the intra-Faculty horizontal mobility of the students.

The Faculty is taking serious measures for the realization of these intentions. As it was mentioned, a special commission is created with a task to work out and to propose a plan for redefinition of the structure and the Study programs.

The FTM considers seriously the need for having strategy for permanent improvement of the management of the Faculty, for updating the study programme and its provision, and for conferring to students a real responsibility and ownership of the quality assurance process.

Our interlocutors, especially the Dean's team and the Commission for SE, were convincing with their intentions to put the restructuring of the Faculty and the study programmes as a priority task for them.

The Faculty sees Self assessment and External evaluation as the main instrument for improvement of quality and for establishment of a functional QA system. The academics are ready to address the challenge of serious redefinition of the study programmes.

Tel/Fax: +43-1-945-6558
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The Faculty commission for SE is ready to continue assuming the key role in the QA issue until the end of its mandate. The commission is ready to interact with the University commission and the Evaluation Agency.

The Faculty understands the necessity of engaging the students in the management. This should go beyond the formal representation of the students in the Faculty administrative bodies. Special programmes should be developed for training students in curriculum development and the implementation of relevant methodology of provision, including a modular structure and a credit transfer system.

The short time did not allow us to address the Credit Transfer System in detail. Unfortunately, this issue is not included in the SER.

At the same time, the need to develop a credit system is well understood. The current structure of the SPs is not favourable for this important task. In my opinion the major obstacles are:

- The long duration (9 semester) of the Bachelor studies;
- The existence of too heavy workload subjects, some of them spreading over two-semesters;
- Too strong importance given to the diploma theses, both for the Bachelor and for Master studies;
- The current examination procedure

The Faculty has to cope with all these (and other related) problems by setting the introduction of ECTS as an immediate priority.

Challenges and Recommendations

1. The establishment of a Credit Transfer System compatible with the ECTS should follow the intended revision of the SPs;
2. To proceed with a modularization of the big subjects.

Additional Suggestions

3. The establishment of the ECTS is an ideal theme for cooperation at all possible levels – faculty, university, country, Europe. The best idea is to address the Tempus partner institutions for cooperation and assistance in the search of good solutions and relevant experience.

Annex: Horizontal Findings

Observations

High commitment and enthusiasm on the side of internal self-evaluation commissions, and openness and interest of Faculty management for the process resulted in a solid diagnosis, thorough analysis, and a long list of recommendations for change. Moreover, in some cases measurable change was already reached at as a direct result of the self-evaluation process.



Challenges and Recommendations

The over-aging of staff was identified as a time-bomb for UKIM. Filling this gap with young brilliant staff, and use their capacity instead of that of inactive professors without knowledge or practice in modern teaching techniques. There is a urgent need to increase the number of positions for assistants and young faculty at all the Faculties visited.

Study Programmes need to be broader, less, and shorter. Broader programmes are requested by the labour market, where flexible graduates are requested who can swap from one field of action to another, applying so-called core skills and inter-disciplinary experience to a rapidly developing job market.

Continuing training offers, a variety of post-graduate programme (to be organised also jointly with and for industry and commerce), and specialisation courses for employed people are both a growing request from society and a possible source of income. Every University needs to react to the trend towards Life-Long Learning across Europe.

Innovation in teaching is badly needed across faculties. Despite individual successes, on average far too much inefficient ex-cathedra teaching takes place. It is to be substituted by contemporary, interactive and project-like and practice-oriented training and learning styles. Training of staff in this field, and tools for measuring the outputs of the teaching units should be developed therefore. Students' ability to cope with their challenges after graduation is the most important criterion to be used in this respect.

Additional Suggestions

Alumni organisations should be set up. Far beyond their immediate function of telling the Faculty/University what happens to their graduates, in many countries they have been found an extremely helpful source for inspiration, innovation, information on labour market requirements, sponsorship and political contact.

The budget allocated to research is too small at present. Regulations on a 90% percentage allocated to teaching (= staff costs) are counter-productive to innovative and updated curricula. Attractive teaching is key to attract the best students, and to guarantee to them success in their professional life, as competent individuals, and as democratic citizens.

The initiated process of self-evaluation should be re-launched with new tasks, and triggered with new responsibilities. The Commissions should be empowered to undertake further prioritisation and operationalisation of necessary change. Moreover, in order to be acceptable partner for international cooperation, to attract foreign students, and to be visited by top scientist and educators from other countries, the University as a whole needs to be seen. At the end, an institutionalised and regular system of continuous self-improvement and external advice will enable Faculties and UKIM as such to keep the speed of development in international Higher Education.

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