



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ

HELLENIC REPUBLIC

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ΑΡΧΗ ΔΙΑΣΦΑΛΙΣΗΣ ΠΟΙΟΤΗΤΑΣ

HELLENIC QUALITY ASSURANCE AGENCY

ΑΝΩΤΑΤΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

FOR HIGHER EDUCATION

EXTERNAL EVALUATION REPORT

DEPARTMENT of DENTAL TECHNOLOGY

TEI of ATHENS

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External Evaluation Committee

The Committee responsible for the External Evaluation of the Department Dental Technology of the Technical Institution of Athens consisted of the following four (4) expert evaluators drawn from the Registry constituted by the HQAA in accordance with Law 3374/2005 :

1. **Dr. Martin Steiner**, Sektion Werkstoffkunde und Technologie der Universität Kiel
Coordinator
2. **Priv. Doz. Dr. rer. nat. Dieter Dirksen**, Universität Münster, Bereich Werkstoffkunde und Technologie, Dept. of Prosthetic Dentistry, Muenster, Germany
3. **Professor Tim Watson**, King's College London Dental Institute, Biomaterials, Biomimetics and Biophotonics Research group, London, UK
4. **Mrs. Christiane Wulff** , Expert, Doctor of Dentistry and Expert in dental Technology, Greece

N.B. *The structure of the “Template” proposed for the External Evaluation Report mirrors the requirements of Law 3374/2005 and corresponds overall to the structure of the Internal Evaluation Report submitted by the Department.*

The length of text in each box is free. Questions included in each box are not exclusive nor should they always be answered separately; they are meant to provide a general outline of matters that should be addressed by the Committee when formulating its comments.

Introduction

I. The External Evaluation Procedure

The External Evaluation Committee (EEC) visited the TEI Athens and the Department of Dental Technology between 1st and 3rd November 2010. We were introduced to the procedures and rationale behind the HQAA and its visitation process on the morning of the 1st November. Following this we were taken to the TEI Athens and met the Vice President of academic affairs at the TEI and senior staff of the Department. The next two days included presentations and meetings with the vast majority of staff within the Department. An overview of the current status of the Department covering the undergraduate and post-graduate curriculum, teaching methods, research, administrative staff and infrastructure was presented on the first afternoon. Reflective conclusions drawn from producing the internal evaluation report (IER) and aspirations for improvement and future development were given at the end of this session. There was then extensive questioning by the panel of much of the material presented, both in the IER and following the Department's verbal presentations. Teaching material was shown to the panel, including course assignments and research project write-ups.

On the second day (2/11/10), the EEC visited the teaching facilities of the Department, including the lecture rooms and all of the technical laboratories and facilities. The EEC also met with teaching, administrative and technical staff members and visited the research facilities of the Department. During the last panel session, the scientific and laboratory associates of the Department, post graduate students and graduate representatives were interviewed. Interactions between the TEI and the Pan Hellenic Federation of Dental Technicians were also discussed with a representative of this national body.

On the final official day of the visitation (3/11/10) the EEC met with approximately 30 students of the Department, in various stages of their course. There followed discussion of the IER with Professors Yannikakis and Prombonas where the internal and external pressures and challenges on the Department were addressed. The visit continued with visits to the TEI-Library, the e-class Room, the network centre and concluded with a meeting with the TEI Vice President of Academic Affairs.

Extra to the official itinerary, the EEC visited the Dental School of Athens, in particular the Dept. of Dental Biomaterials, which is the co-sponsor of the Masters taught postgraduate course. We met with Prof Eliades and his team and were shown the facilities for research within his Department and some of the clinical and technical laboratory facilities of the Dental School.

The Committee met with the following:

- Vice President of academic affairs TEI
- Senior staff
- Full time teaching, administrative and technical staff
- Part time scientific and laboratory associates of the Department
- Graduates and post graduate students
- A representative of the Pan Hellenic Federation of Dental Technicians
- Students from different years of study

- IT support personnel
- Prof Eliades, Dept. Dental Biomaterials, University of Athens

List of Reports, documents, other data examined by the Committee.

- The Internal Evaluation Report & Appendices dated 15/12/2009, prepared by Professors Yannikakis , Dimitropoulou and Prombonas (Internal Evaluation Committee) using the resources of the Department and the information and details that were gathered by the members of the Department and the students.

Appendices include:

- Study guides
- Statutes of joint PG programme with the University of Athens
- Staff CVs
- Writing guidelines for final year dissertation
- Other data as requested by HQAA
- Student Work Assignments
- Final year dissertations
- Examples of recommended textbooks
- Course teaching material

Groups of teaching, administrative staff and students were interviewed throughout the evaluation visit, in some cases the same individuals a number of times because of shared responsibilities.

The EEC visited all of the facilities within the Dental Technology Department and observed most of them in use by staff and students. These included all of the teaching classrooms, practical laboratories, research laboratory, store rooms, IT support, administrative and office accommodation.

II. The Internal Evaluation Procedure

The IER is a true and accurate record of the Department with in-depth provision of detailed information and reflective analysis of the data recovered by the QAA process. Clearly, the academic and administrative staff preparing the report have striven to make a highly commendable and accurate representation of the Department using the information and resources available. This has allowed the Department to identify weaknesses which can be and are being addressed. It has focussed the Department's senior management team to concentrate on new strategic developments which will consolidate an already well-established Department.

A. Curriculum

To be filled separately for each undergraduate, graduate and doctoral programme.

APPROACH

The Curriculum sets out to provide an education suitable for a graduate to be able to practice independently in the field of dental technology with a wide ranging understanding of the theory and scientific principles of the discipline, be competent in the basic practical skills and be aware of the legal, professional and management requirements of running a modern dental technology laboratory. The curriculum consists of a continuing exposure to the theory of the subject with an increasing level of complexity with regard to practical training, finishing with the final semester student placement in an outside dental laboratory.

A recent curriculum development is the Masters in Materials for Dental Technology whereby postgraduates will have an in-depth knowledge of the materials science underpinning dental technology and an understanding of research methods. Due to the advanced nature of this course, academic and scientific rigor has been maintained by making the program joint with the University of Athens Dental School in the Department of Dental Biomaterials Science: the EEC is fully supportive of this excellent initiative.

There are no official PhD programs in the TEIs of Greece.

The curriculum (established for the last two years) has been developed as a team by the academic, scientific and technical staff in conjunction with the General Assembly of the Department. The requirements were determined according to the Department's unique knowledge of the professional requirements of dental technicians, consultation with the Pan Hellenic Federation of Dental Laboratories, and statutory requirements of the respective Ministries of Health, Education and Employment.

It is the opinion of the EEC that the curriculum delivers against the set objectives which are appropriate for the needs of the State and society.

It is evident that the Department has had a continuing evaluation process for previous curricula which is continuing.

IMPLEMENTATION

The program of undergraduate studies is satisfactory regarding breadth, depth and appropriateness; it combines well theoretical and practical aspects of training dental technology. Moreover, all members of staff are well qualified and thus ensure that a high quality of delivery of teaching material is achieved. The relatively poor staff/student ratio is an impediment to the delivery of the curriculum.

There is great international variation in the delivery of training in dental technology ranging from an apprenticeship with day-release studies at further education colleges to degree-based training in colleges and universities. The Department of Dental

Technology at the TEI Athens is unique in Greece and is the only recognised body for the training of independent dental technicians at degree level. Other technical training can only produce technical assistants who would work under the direction of a graduate or suitably qualified technician. The EEC is content that the technical training standards that are set would be acceptable in any technical professional organisation in a member state of the EU and that the academic rigor is similarly equivalent at BSc level.

There appears to be a requirement for a 60/40 split in theory/practical training according to the undergraduate studies policies of the Greek Ministry of Education. It is irrational that this is rigidly imposed across the complete curriculum as the requirement for greater time and exposure to practical skill development is clearly more pertinent towards the end of the course with the underpinning theory delivered at an earlier stage. The Greek education system allows and certainly does not discourage students from extending their study time beyond that laid out in the curriculum. This increased student number therefore creates significant organisational and resource problems for departments.

The curriculum is coherent and functional with respect to the Greek education system. The EEC considers that the material covered is satisfactory for educating and training a dental technician, with an appropriate emphasis on the basic and more advanced subjects. The low staff/student ratio does not easily allow for support for weaker students, so also delaying graduation for a significant number.

The reliance upon staff on short-term contracts can give rise to academic and administrative difficulties as this burden is shifted to the full time staff. The office space allocated to staff is totally inadequate when compared to any international academic standard. Laboratory space is only barely sufficient because of the careful timetabling of the Department and the duplication of sessions to accommodate the high student numbers. The equipment is well maintained, but in some areas would benefit from upgrading.

RESULTS

The EEC believes that the current curriculum implementation is sufficient in achieving the department's goals and objectives.

IMPROVEMENT

The Department is conscious of the need for better exposure to realistic technical training of the undergraduates and is keen to implement their placement in a third party laboratory environment earlier in the course. This laboratory would be managed by staff from the TEI and would be a more realistic learning environment for technical training. The Department is aware that the timely graduation of students is a high priority. The Department is keen to give the undergraduates a greater exposure to practical research projects in addition to the library based literature review in the final year.

B. Teaching

APPROACH:

The Department has a policy of a mixed economy of theory and practical teaching with close interactions between the staff and students. The delivery of teaching material uses modern techniques with adequate A/V support, both in theory and practical classes. These may be supplemented by DVDs of laboratory procedures. The relatively poor staff/student ratio is an impediment to the delivery of teaching. This is not a problem for the theory classes, but clearly leads to problems with the practical classes, where, if there is a shortage of staff then a ratio of 1/25 may be considered unsafe depending on the task in hand (normally adjunct staff and assistants give a ratio of 2/25). The EEC considers that the laboratories are more crowded with students in these class sizes than is optimal. The IER states a 30% excess in registered numbers over the optimal capacity (65) of the Department i.e. 85 students over the last two years. In order to accommodate the large numbers of undergraduates on the course adjunct staff are employed on short-term contracts. These may be less effective in the management processes of the Department and teaching quality may therefore suffer: as also indicated by the student survey.

The Department struggles to provide adequate quality materials for the technical exercises within the budget allowed. This may limit the scope for delivering complex technical exercises: development of a third party production lab within the auspices of the TEI may help to ameliorate this problem by generating income for the Department within the TEI.

The delivery of theory teaching is sufficient. However, student attendance at lectures is poor, especially in the later stages of the course. The EEC suggested that increased practical elements be incorporated into these later theory sessions to improve the attendance rate. There is some developing practice for the delivery of lecture material in electronic format whereby the students are given copies of the PowerPoint slides of the lecture: this is to be encouraged. A movement towards setting topics for students to self-research and present to their colleagues, rather than being formally presented by staff in lectures may be an alternative approach which the EEC believes could improve attendance for theory classes.

The current examination approach is entirely based on written exams at the end of the semester, but there is a small contribution to the final marks from practical work undertaken previously. The students respect the fairness and accuracy of the marking systems.

IMPLEMENTATION

The level and quality of teaching are considered to be high as evidenced by the results given in the student questionnaires, also supported by interviews of the EEC with the students. Quality and adequacy of teaching materials and resources is sufficient; being constantly brought up to date, with senior staff writing textbooks on the subject. The students are closely guided in their library-based research projects, critically evaluating the relevant literature in the final year. Many of the staff have some research experience. There is clearly a philosophy of developing new staff with research training as a result of the new MSc program as well as from previous non-tenured staff who have received such training abroad.

It is likely that the international contacts for both staff and students will increase as a consequence of this training abroad: there is much enthusiasm for this.

RESULTS

The student assessment of teaching is generally positive. Pastoral care of students appears well structured with advertised sessions for students to approach members of staff with course-related problems.

The graduation rate is sub-optimal in that a four year course on average takes five years for a graduate to complete. The teaching should be capable of delivering a graduate in the allotted time, but there seems to be little incentive for either students or teachers for timely completion. This problem appears to be endemic in the Greek higher education system and the EEC finds it hard to comprehend how this can be economically satisfactory for the country at large. From the data presented in the IER the length of studies, on average, appears to be increasing to at least six years and this trend must be reversed. Data concerning final degree grades and time to graduation was not particularly robust, as different dates were presented for each parameter. The EEC detected a tendency for grade increase over time and it was noted that the student intake was at the high end of the grade score average for university admission.

The EEC did not detect any differences in the grade scores between courses as the teaching program is well integrated across the syllabus and duration of the course. The EEC was concerned at the total lack of recording of work undertaken by undergraduates in the final semester placement in outside laboratories.

The outcomes of the post graduate programs could not be assessed as this is a recent development.

IMPROVEMENT

The Department is keen to develop electronic distribution of lecture material for the students and the IT structure of TEI appears to be sufficient to support this. They are adapting their teaching times with increased flexibility in order to accommodate large student numbers.

The Department feels that the exam system would be improved through increased transparency levels by opening access to exam answers and solutions. The EEC considers that this would make for a less robust examination system and will require a massive increase in workload in the construction of suitable examination material.

The Department is under staffed for its current nominal establishment and, in the context of an increasing number of students, would especially benefit from an improved ratio of full time / part time staff. The short-term employment of staff is not conducive for establishing succession planning within the Department.

The Department aims to improve practical training in realistic outside laboratory conditions in the final semester. These include the following:

- Determination of lab standards and specifications thought to be adequate for

practical training.

- Cooperation with the competent bodies, such as the Pan-Hellenic federation of dental laboratories for the determination and standardization of labs meeting the specifications.
- Training of the persons in charge of the labs that shall receive students for their practical training is also necessary.

The EEC recommends that the students produce a log-book of the work undertaken within this final semester.

The Department wishes to create a facility that is equipped as a modern production dental technology laboratory. Graduate dental technicians would run the lab under the supervision of the teaching staff members including the work experience placement of final year undergraduate students. The lab may work in collaboration with the students of the Dental School of NKUA or any other interested dentists. The EEC welcomes this concept as it could improve linkages both to outside laboratories and the University of Athens, as well as providing a more regulated technical experience in the final years of study. The establishment of this facility off-site may also improve the educational benefit of the students.

C. Research

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

APPROACH

The Department is endeavouring to increase its dental technology related research output, but has had no central focus for this or significant funding to support these activities. There is not yet a cohesive research strategy in place, but the enthusiasm to undertake research projects is clear to see. The collaboration with the Dental School at the University of Athens offers excellent opportunities for training of staff and postgraduate students in modern dental materials research.

Whatever research work is carried out in the department accrues from the initiatives of the academic staff. The Department wishes to become more independent in its research activities, but the EEC recommends that these should be complimentary and synergistic with those of the Dental School. The Department can uniquely provide technical resource and expertise in the matter of sample production for materials science related challenges. Staff are motivated and capable of posing the scientific questions that require investigation.

IMPLEMENTATION, RESULTS & IMPROVEMENTS

At an undergraduate level the students are exposed to library-based research projects for in-course assignments and their final dissertation. All the scientific teachers were keen to increase the student exposure to laboratory-based methodology projects. The EEC were concerned that staff levels and infrastructure facilities could not support this aspiration across the student body, but it could be used as an incentive to further encourage the keenest and best performing students.

The EEC were shown a new, bespoke research area for the Department, which was in the process of being commissioned. This is a valuable resource, but will need further investment in equipment to realize its potential. The EEC would in particular recommend that mechanical testing equipment such as a universal testing machine (e.g. Instron or equivalent) be purchased. However, the facility can already serve as a useful testing area for a variety of technical materials-related projects.

The publication output for the Department is commendable, considering the limited resources and time available, consequent to the major teaching load. Research collaborations with the University of Athens will clearly improve the research profile of the Department. Sabbatical visits of senior staff to outside research active organizations would also be beneficial and speed development of the research ethos.

The new initiative of the materials science-based MSc with the University of Athens will nurture a new generation of young staff with research training and an up-to-date understanding of modern research methods.

D. All Other Services

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

APPROACH

The Department is a fully integrated unit of the TEI Athens and makes good use of the institutional resources available. The Department is concerned about the lack of space for students and, in particular, staff office accommodation: a view strongly held by the EEC.

There is a move towards electronic recording and monitoring of student progress. The preparation of the QAA report placed a major administrative burden on the staff, but the process has catalyzed the development of more streamlined evaluation processes within the Department. There is an effective and secure IT based system for scoring student progress. The management of the Department consists of a General Assembly with representation comprising all of the teaching staff members of the Department, student representatives (40% of the total number of teaching staff) and Specialized Technical Staff representatives (50% of the total number of teaching staff): this meets every semester. A Council meets fortnightly, consisting the Head of the Department, the Instructors in Charge of Sectors A (Fixed Prosthodontics) and B (Removable Prosthodontics) a representative of the students and a representative of the Specialized Technical Staff when required. There are then a large number of very

small committees (working groups) which manage discrete components of the Department. The EEC can see that this administrative structure is effective and the Department is cohesive and well-motivated, with adequate student representation and involvement. The student presence is not an issue because of the compulsory nature of practical laboratory exercises, but theory classes are less well attended.

IMPLEMENTATION, RESULTS & IMPROVEMENTS

The Department has a small administrative support team currently consisting of two individuals. The EEC considers that this is inadequate for the continued administrative load. The establishment should be increased to four: it is not effective use of academic staff time to be engaged in administrative tasks.

Student access to the library, PCs and free internet access is satisfactory. There is some evidence of student counseling, but the EEC did not inspect their athletic-cultural activity. However, it is evident that the students are well-supported in this by the TEI Athens.

Collaboration with social, cultural and production organizations

The EEC cannot comment on the quality, originality and significance of the Department's activities with respect to student extra-curricular activities as these were not assessed. The Department is outward-looking in its dealings with the competent bodies, such as the Pan-Hellenic Federation of Dental Laboratories.

Historically, in 2003, the Department was involved with the State-sponsored process for the licensing of Assistant Dental Technicians to enable them to manage registered laboratories. The department cooperates with the Ministry of Health and Social Solidarity, the Dental Faculty of Athens and also with associations and unions of the branch of dental technicians.

E. Strategic Planning, Perspectives for Improvement and Dealing with Potential Inhibiting Factors

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

The EEC notes that there is a plan for cooperation with the Dental Faculty of Athens, to develop technical support for dental school undergraduate prosthodontic needs via the undergraduate activities at the TEI undertaken in a third party laboratory, managed by staff of the Department of Dental Technology in the TEI. Currently, this work is carried out by private dental labs for the dental undergraduates. If cooperation develops the students of the department will be able to produce work on behalf of the dentistry students, though this will require appropriate technical infrastructure in this new

laboratory facility.

Potentially inhibiting factors at State Level are the rigid rules and regulations governing TEI education. The existing system allows and certainly does not discourage students from extending their study time. This increased student number therefore creates significant organisational and resource problems for departments. The rigid 60/40 split in theory/practical training according to the undergraduate studies policies of the Greek Ministry of Education is restrictive.

The IER clearly states the short-, medium- and long-term goals which are in the best interests of the students, the staff and the TEI. Educational plans and actions for improvement by the Department are focussed, in the medium term, on the final semester training. Specifications that are adequate for practical training are to be achieved by cooperation with outside competent bodies as well as the vetting of laboratory owners and staff that receive students for ensuring a high quality of practical training in the final semester.

Current financial pressures are clearly limiting the ability of higher education establishments to expand and deliver high quality in all areas of scholarly endeavour. The TEI is not immune from these pressures, but if Human Resource issues are not addressed then the delivery of teaching at the Department of Dental Technology will be seriously impaired.

The Department is committed to developing a research policy and a strategy. They wish to pursue this at two levels. At the undergraduate level this already consists of essential training in research methodology: they wish to expand this to include practical techniques and experiments. The EEC recommends that this should only be for a limited number of students who are not delayed in their studies and are performing at the highest level. At the postgraduate level, research activity is increasing because of the unique joint MSc program with the dental faculty in the University of Athens. The EEC observes that the two partners have unique capabilities. The TEI is well placed to become the main provider of the technical manufacturing resource in this mainly biomaterials-based research program. With moderate further investment in calibrated equipment the Department would be able to undertake materials testing to a certifiable level.

The EEC understands that the Dental Technology graduates of the TEI are uniquely qualified to be independently practicing owners and licensees of a Dental Laboratory, following a four year course of study, although vocational experience would be advantageous. We understand that there is some confusion regarding the ability of Assistant Dental Technicians trained in a TEL to be licensed, whereby the current statutes appear to allow this after only three years of study. The EEC cannot comment on the professional status of the latter group, but it is evident from the high educational standards achieved, observed also by the EEC, that the TEI graduates best meet the required international standards for independent laboratory management.

F. Final Conclusions and recommendations of the EEC

For each particular matter, please distinguish between under- and post-graduate level, if necessary.

The Department of Dental Technology is a unique department in Greece for the delivery of degree dental technical education and training which has continuously developed over the last thirty years. In the opinion of the EEC, the TEI graduates meet the required international and professional standards for independent laboratory management on graduation. The EEC recognises that this is a cohesive Department with a highly motivated and well trained faculty, both at the scientific and technical levels, whose team-work produces a well-rounded graduate student. We were particularly impressed by the high standards and enthusiasm of the vibrant student body.

Good practices

The EEC noted many examples of good practice within the Department.

Undergraduate education

- The curriculum delivers against the set objectives which are appropriate for the needs of the State and society.
- The technical training standards that are set would be acceptable in any technical professional organisation in a member state of the EU and that the academic rigor is similarly equivalent at BSc level.
- The material covered is satisfactory for educating and training a dental technician, with an appropriate emphasis on the basic and more advanced subjects.
- The current curriculum implementation is sufficient in achieving the department's goals and objectives.
- The level and quality of teaching are considered to be high as evidenced by the results given in the student questionnaires, also supported by interviews of the EEC with the students.
- The administrative structure is effective and the Department is cohesive and well-motivated, with adequate student representation and involvement.

Postgraduate education

Collaboration with the University of Athens Dental School in the Department of Dental Biomaterials Science shows that the Dental Technology Department is outward looking and progressive: the EEC is fully supportive of this excellent initiative.

Weaknesses

Many of the weaknesses that the EEC identified within the Dental Technology Department relate to pressures of space and finance. Most of these are derived from political and regulatory inertia in the Greek Higher Education Sector leading to institutions with too many students chasing overstretched resources.

- The graduation rate is sub-optimal in that a four year course on average takes five years for a graduate to complete and there is evidence of this worsening.

- There seems to be little incentive for either students or teachers for timely completion.
- The low staff/student ratio does not easily allow for support for weaker students, so also delaying graduation for a significant number.
- The practical laboratories are crowded and staff office accommodation is totally inadequate.
- The Department has a small administrative support team that is inadequate for the continued administrative load.
- There is a total lack of recording of work undertaken by undergraduates in the final semester placement in outside laboratories.

Recommendations

- On average, the length of studies appears to be increasing to at least six years. This trend must be reversed with strong incentives for timely graduation of students.
- A third party laboratory would massively improve student practical experience in a controlled environment.
- The external laboratory placement should be evaluated. Students should produce a log-book of the laboratory work undertaken within this final semester.
- Staff accommodation has to be improved.
- Attendance for theory classes could be improved by setting topics for students to self-research and present to their colleagues, rather than being formally presented by staff.
- Student access to lecture content via electronic means should be further encouraged.
- Collaboration with the University of Athens for post graduate studies and research should be strengthened so that these should be complimentary and synergistic.

The Department has shown by its commitment to the continuous improvement of the teaching quality and experience of its graduates that it is open to suggestions for change and improvement. It delivers a course that is easily comparable with similar institutions all over Europe.