

# Evaluation of the postgraduate course “Medical Research Methodology” of the Aristotle University Medical School, 5 years after its launching.

Emmanouil Smyrnakis, Smaragda Arvanitidou, John Kotsinos, Alexis Benos

*Medical School, Aristotle University, Thessaloniki, Greece*

**ABSTRACT:** *Introduction:* Evaluation in education is used as a necessary procedure in order to readdress educational policy in curriculum, teaching, learning or examinations.

*Aims:* The aim of this paper is to describe and critically analyse the evaluation process of the postgraduate course “Medical Research Methodology” of the Aristotle University Medical School, 5 years after its launching.

*Population:* All students (190) who attended the postgraduate medical program of Aristotle University of Thessaloniki from 2004 to 2008.

*Method:* Students were asked to rate diverse characteristics of the program on a five grade scale. According to the above mentioned aims, an on-line questionnaire was designed, piloted and implemented containing 41 close-ending and 2 open-ending questions.

*Results:* Subjects regarding the aims and the final assessment of the course were graded with the highest scores. In contrast, the essays given, the students’ belief on skills gained, the clarity of the principles and techniques, as well as the quality of the supporting material, achieved lower scoring.

The variability of the grades indicates that there is enough space for important improvements.

*Conclusion:* The successful implementation of an evaluation system of a postgraduate program is producing important information and evidence for its continuous improvement.

*Key Words:* Evaluation, Postgraduate, Medical education.

## INTRODUCTION

Nowadays, evaluation of the educational activities is frequently addressed as a priority in the agenda within the educational strategies of the European Union directive bodies and consequently of the majority of the governments of the member states. This evaluation process, determined by the dominant values of the free market economy, is targeted towards the cost efficiency approach and the procedure of accreditation, in order to open the “educational market” to the profit making competition.

Nevertheless, besides the above mentioned use, evaluation is a long-standing characteristic of the everyday life of the academic society<sup>1</sup>, being both, an

important part of the recruitment and upgrading procedures of the academic staff and a crucially needed process for curriculum development. Questions such as “**is this curriculum appropriate**”, “**what are the outcomes of this curriculum**”, “**is this curriculum meeting the needs of the learners**”, can only be replied if an evaluation process is inbuilt in the educational activities<sup>2</sup>.

Evaluation in education is “*a systematic approach to the collection, analysis and interpretation of information concerning any aspect of the conceptualisation, design, implementation and utility of educational programs*”<sup>3</sup>. It is used to identify areas where teaching needs to improve and, generally, as a necessary proce-

ture in order to readdress educational policy in either, teaching environment<sup>4</sup>, curriculum, teaching, learning or assessment and faculty development<sup>5</sup>.

The aim of this paper is to describe and critically analyze the evaluation process of the postgraduate course "Medical Research Methodology" of the Aristotle University Medical School, 5 years after its launching, in order to provide a useful feedback to teachers and faculty of this course and contribute in the continuous process of its refinement and improvement.

### *Background*

The Medical School of Aristotle University of Thessaloniki runs a post-graduate program leading to a Masters degree in Medical Research Methodology since 2003. The first pilot attempt to a postgraduate program was made in 1999 when the Program of Post Graduate Studies in Medicine was founded, funded by the Operational Programme for Education and Initial Vocational Training of the Hellenic Ministry of Education. This program, leading to a Master of Science degree in Medical Research Technology, run for four years (1999-2003). The experience gained from this period was evaluated by an academic committee, which was set with the specific task to re-organize the postgraduate program of the School. After a productive activity - including brainstorming, analysis, feedback and consensus decisions - during the academic year 2002-03, this committee concluded to a proposition for the implementation of a new postgraduate course which was accepted and consecutively implemented by the School.

Thereafter, the new Program of Postgraduate Studies in Medicine leading to a Master of Science degree in Medical Research Methodology was established during the academic year 2003-04.

The general aim of this program is to provide high level postgraduate studies in the Medical School of Aristotle University of Thessaloniki needed for internationally competitive diplomas of specialization and further enrolment of the students to Ph.D. research activities. As a first necessary step and direct response to the needs of the young research fellows of the School, it was decided that the course had to concentrate on Research Methodology. Furthermore, an important characteristic of this program is its underlying concept

promoting the interdisciplinary approach in both research and clinical work. Instead of setting up various independent postgraduate programs, one single program was organized, centered on research methodology, but giving also the opportunity to its participants to individually select courses that are more suitable for their own research interests. For this purpose, the program has three streams: the Basic Sciences Medical Research, the Clinical Medical Research and the Research in Social Medicine<sup>6</sup>. All applicants have to notify in their application which stream they intend to follow.

The course runs for four semesters, opens every year, accommodates approximately 28-46 students selected after completing successfully the preliminary written exams. During their studies, students are assessed by means of written/oral examinations and short essay presentations at the end of each semester. Enrolment in the next semester requires successful pass of all the courses from the previous semester.

In the first semester, six compulsory courses for all streams are taught. The courses are Research Methodology, Biostatistics, Medical Informatics, Molecular Biology, Medical Physics and Mathematics. The weekly comprehensive programme is composed by lectures, practical sessions, group and home work. During the second semester, students have to attend five elective courses from twenty six possible choices. There is a choice to attend a minimum of three courses from the stream chosen by the students and two more courses from any other they wish. During the third semester, students have to attend three courses from a total of seventy electives offered and are starting the design of their thesis, under the supervision of their tutor nominated personally for every student at the end of the second semester. Finally, during the fourth semester, students are intergraded with the Medical School and they work on their master thesis guided by their supervisor. The master thesis, accomplished at the end of the fourth semester, is presented in an open procedure and assessed by a three-member grading committee (supervisor and two other members of the teaching staff). The Program of Postgraduate Studies in Medicine is coordinated by a Committee, composed by members of the teaching staff of the Medical School and administratively supported by its Secretariat.

**Table 1.** The 10 selected questions from the Evaluation Questionnaire.

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To what degree do you agree with the following statements?  
*1 not at all, 2 just a little, 3 somewhat or moderately, 4 quite a lot, 5 very much*

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1. Were the aims of the course clearly stated?
2. Was the course structured in a logical order?
3. Was it easy to attend the flow of the course? [was it easy to attend the pace of the course?]
4. Were the principles and techniques clearly explained?
5. Do you feel you gained new knowledge and skills?
6. Do you believe that the skills you gained will help you to increase your performance in your work environment?
7. Were you encouraged to actively participate in the course?
8. Was the course supported by literature handouts (papers, notes, citations)?
9. To what extent the essays/tasks helped you to better comprehend the course?
10. To what extent the students' assessment was relevant to the context and the way the course was taught?

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In order to ensure the sustainability of this course and its continuous refinement, a process of evaluation was designed and inbuilt within its procedures from the first year of its implementation. Following the Task-oriented model of program evaluation in graduate medical education<sup>7</sup>, the aim of the evaluation process was *a priori* defined to be the evidence based continuous improvement of the course. The evidence produced, therefore, is to be used and valued by the Coordinating Committee, the stream coordinators and the teachers of the diverse courses.

### POPULATION AND METHODS

The evaluation of the postgraduate course was designed as a process of continuous evaluation of all the relevant activities by the students, which were asked to make their evaluation after the completion of the first semester, a second time after the completion of the second semester and a third time after the completion of the program as a whole.

As for the content of the evaluation, the students were asked to rate in a five grade scale<sup>8</sup> the learning objectives of each course pertaining to: the curriculum, the procedures, the educational environment (didactic, interactive, etc.), the resources and facilities, the tasks that they were given and the assess-

ment methods used. The three-parts approach of the "educational climate" by Chambers and Wall<sup>9</sup> was followed. Finally, the students were asked to give an overall evaluation in view of their initial expectations. As for the teachers' scientific and educational quality, the students were also asked to rate in a five grade scale every teacher they encountered.

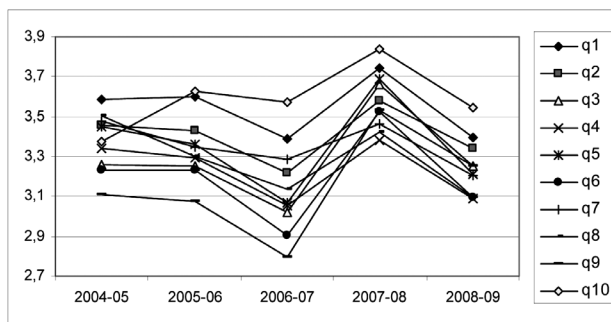
According to the above mentioned aims, a questionnaire was designed, piloted and implemented containing 41 close-ending and 2 open-ending questions. After the pilot implementation during the first year the program run, (academic year 2003-04), the evaluation process was finalized as a web-based online application securing safety, efficiency and speed in all its phases from the personal and anonymous input by the students to the final critical appraisal of each course and teacher. After the completion of the evaluation process the online software designed by one of the authors (JK) is automatically producing the final report.

In this study, the results of the evaluation of the six core courses of the first semester of the postgraduate program are presented. Ten questions out of 43 were selected for this analysis on the ground of their content related to an overall evaluation of the procedures (Table 1).

All students (190) who attended the postgraduate

**Table 2.** Response rate in the evaluation in the 5 years of study (2004-08).

<i>Academic year</i>	<i>Number of students</i>	<i>Participation in the evaluation</i>	<i>Response rate %</i>
2004-05	44	43	97.73
2005-06	46	46	100.00
2006-07	28	28	100.00
2007-08	37	36	97.30
2008-09	35	33	94.29

**Figure 1.** Mean scores by year of evaluation, in the questions 1 to 10 for the 1<sup>st</sup> semester, in all 6 courses.

Note: questions content in Table 1.

medical program of Aristotle University of Thessaloniki from 2004 to 2008 were asked to participate in the evaluation of each semester after the completion of the courses and examinations. At the beginning of the semester, students were provided a folder containing instructions on how to evaluate courses and teachers. Each folder contained two different forms of questionnaires, one for the evaluation of the courses and one for the evaluation of the teachers, in printed form, so that notes could be kept throughout the semester. The aim was to reduce the “recall error” that would arise if students were asked to evaluate, for example, a teacher who had taught them at the beginning of the semester.

### STATISTICAL ANALYSIS

Data were exported and analysed using the statistical program SPSS 11.5. A descriptive analysis of the 10 selected questions in the 6 core courses of the 1<sup>st</sup> semester of the postgraduate program for 5 years (2004-2009) was performed.

### RESULTS

The overall response rate in the evaluation of the 1<sup>st</sup> semester for the 5 years of this study was 97.89% (186 out of 190). In Table 2 the response rate for each year is presented separately.

Based on the evaluation for each of the six courses of the first semester, the mean scores of each of the ten questions used are shown in Figure 1. It is evident that questions of the year 2006-07 received the lower (2.8-3.6), while those of the year 2007-08 the highest (3.4-3.8) scores.

Questions 1 and 10 receive the highest score in all years evaluated. In all courses, the aims are clearly stated (question 1) and the final assessment of the students in every course was found in a highly satisfactory level relevant to the context and the way the course was taught (question 10) (Table 4).

In contrast and especially for the first three years the tasks/essays given in the courses helped somewhat but not in a clearly satisfactory level the understanding of the course (question 9). The same trend is observed concerning student’s believes about the impact the skills gained will have to their performance in their work environment (question 6).

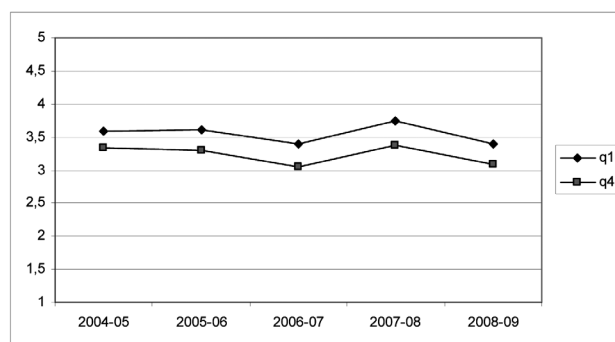
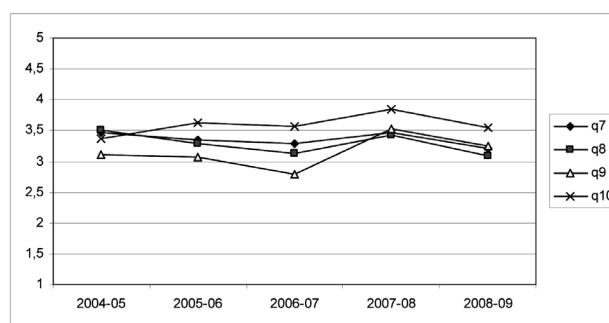
According to the students overall evaluation during the academic years 2007-08 and 2008-09 it seems that some problems emerged when explaining the principles and techniques (question 4), as well as supporting the courses with literature handouts (question 8).

Specific observations can be drawn by assessing each course individually which though is beyond the aim of this study.

As for the evaluation of specific features of the programme, the questions grading aims and course content, have satisfactory grades throughout the study

**Table 3.** Mean scores by question and academic year (in bold are highlighted the two higher scores per year and in italic and bold the two lower scores respectively).

	2004-05	2005-06	2006-07	2007-08	2008-09
q1	3.59	3.60	3.39	3.74	3.39
q2	3.46	3.43	3.22	3.58	3.34
q3	3.26	3.25	3.02	3.66	3.25
q4	3.34	3.30	3.05	3.38	3.09
q5	3.45	3.36	3.07	3.69	3.21
q6	3.23	3.23	2.91	3.52	3.10
q7	3.48	3.35	3.29	3.47	3.20
q8	3.51	3.30	3.14	3.43	3.10
q9	3.11	3.08	2.80	3.53	3.25
q10	3.38	3.63	3.57	3.84	3.55

**Figure 2.** Aims and course presentation.  
Note: questions content in Table 1.**Figure 3.** Teaching and methods of students' assessment.  
Note: questions content in Table 1.

period, showing nevertheless a sudden drop during 2006-07, which is recovered the next academic year (Figure 2).

Similar trends are observed for the questions regarding the **Organization and structure of the course** (question 2, question 3) and the **Usefulness of the program** (question 5, question 6).

As for the **teaching and assessment methods** the scores of the respective questions are also showing similar trends with the striking "relapse" in academic year 2007-08 and the following "regression to the mean" (Figure 3).

Aiming at the specific evaluation of each course separately, the possible scoring variability between courses was estimated by calculating the mean scores of each question for all the six courses of the first semester in all 5 years of the study (Figure 4).

The obvious variability between courses observed in Figure 4 is striking, especially regarding the question relative to the encouragement for active participation (difference between minimum and maximum 3.26), the question referring to the usefulness of the course to increase skills in the work environment (difference 3.06), the evaluation of the given literature support 8 (difference 2.97), the estimation of gaining new knowledge and skills (difference 2.87), as well as in the degree the essays help in the understanding of the course content (difference 2.83).

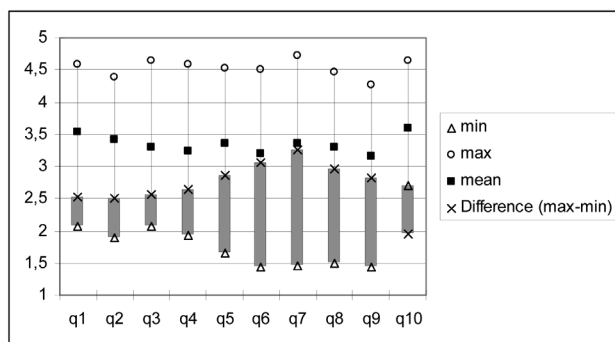
Finally, and in order to generate evidence for the improvement of all courses in Table 4 are presented the strengths and weaknesses of each course.

## DISCUSSION

The main limitation of this study is that the evaluation process of the postgraduate program presented here is

**Table 4.** Strengths (the 2 higher scores) and weaknesses (the two lower scores) by course.

	Course 1	Course 2	Course 3	Course 4	Course 5	Course 6
q1	<b>max</b>		<b>max</b>	<b>max</b>		
q2				min		<b>max</b>
q3	min	min	min			
q4	min	min	min			
q5		<b>max</b>				
q6		<b>max</b>				min
q7				min	<b>max</b>	
q8			<b>max</b>		min	
q9					min	min
q10	<b>max</b>			<b>max</b>	<b>max</b>	<b>max</b>

**Figure 4.** Mean, maximum and minimum mean scores of the 10 questions in the 6 courses of the 1<sup>st</sup> semester in the 5 years of the evaluation.

Note: Bars present the difference between the minimum and maximum mean value in each question.

not based to a variety of sources<sup>10</sup>, but merely on the participation of the enrolled students in the educational activity and the analysis of their satisfaction as it was registered by the evaluation process. That means that only the first two steps in Kirpatrick's hierarchy, as applied in medical education, were fulfilled, leaving unanswered the possible knowledge acquired, the change in professional behaviour and the improved research practice<sup>11</sup>.

High response rates are due to the mandatory system that nevertheless is not producing unreliable data. The general drop of the scores in all questions during academic year 2006-07 (Figure 1) is probably related with the student uprising in that year which produced postponement of many educational activities, which were nevertheless completed.

The observation that the questions regarding the aims and the final assessment have the highest scores is reflecting the quality of the initial design of the courses. On the contrary, the low scoring of the questions on the essays given, the belief on skills gained, the clarity of the principles and techniques explanation, as well the quality of the supporting material is revealing the weaknesses that will have to be dealt with in the organisation of the diverse courses.

The important variability between courses for the scores regarding the questions assessing the encouragement for active participation, the usefulness of the course to increase skills in the work environment, the evaluation of the given literature support, the estimation of gaining new knowledge and skills, as well as the degree the essays help in the understanding of the course content, is providing crucial information on the main factors that influence the final evaluation and therefore could enhance students appraisal if improved.

Finally, the strengths and weaknesses that were described for each course could be used by the Coordinating Committee of the Postgraduate Studies in order to refine the courses and improve the overall quality of the program, gradually introduce an approach of outcome-based curriculum<sup>12</sup> and inspire teachers through the teaching the teachers activities<sup>13,14</sup>.

The implementation and acceptance by the School of the above described process was successful mainly because it was based on strict ethical norms protecting both the anonymity of the students and the discretion regarding the tutors.

Further analysis of the specific determinants of quality for each course is needed at this stage in order to secure the sustainable improvement and possible changes of the program<sup>15</sup>.

## Αξιολόγηση του μεταπτυχιακού προγράμματος “Ιατρική Ερευνητική Μεθοδολογία” της Ιατρικής Σχολής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης, 5 χρόνια μετά την έναρξή του.

Εμμανουήλ Συμυρνάκης, Σμαράγδα Αρβανιτίδου, Ιωάννης Κοτσινός, Αλέξης Μπένος

*Ιατρική Σχολή, Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, Ελλάδα*

**ΠΕΡΙΛΗΨΗ:** *Εισαγωγή:* Η αξιολόγηση στην εκπαίδευση χρησιμοποιείται ως μία απαραίτητη διαδικασία που έχει ως στόχο την προώθηση της εκπαιδευτικής πολιτικής στο πρόγραμμα σπουδών, στη διδασκαλία, τη μάθηση και τις εξετάσεις.

*Στόχοι:* Σκοπός της παρούσας μελέτης είναι η περιγραφή και η κριτική ανάλυση της διαδικασίας της αξιολόγησης των μαθημάτων του μεταπτυχιακού προγράμματος «Ιατρική Ερευνητική Μεθοδολογία» της Ιατρικής Σχολής του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης (ΙΣΑΠΘ), 5 χρόνια μετά την έναρξή του.

*Πληθυσμός:* Όλοι οι φοιτητές (190) που παρακολούθησαν το μεταπτυχιακό πρόγραμμα της ΙΣΑΠΘ, μεταξύ 2004 και 2008.

*Μέθοδος:* Οι φοιτητές κλήθηκαν να αξιολογήσουν διάφορες παραμέτρους του προγράμματος, με τη χρήση μιας 5βαθμης κλίμακας. Για το σκοπό αυτό, σχεδιάστηκε, δοκιμάστηκε και αναρτήθηκε σε σχετική ιστοσελίδα ένα ερωτηματολόγιο με 41 κλειστές και 2 ανοικτές ερωτήσεις.

*Αποτελέσματα:* Οι ερωτήσεις που σχετίζονται με τους στόχους και την τελική εξέταση έχουν λάβει τις υψηλότερες, ενώ, αντιθέτως, οι ερωτήσεις που σχετίζονται με τις εργασίες που ζητούνται, τις ικανότητες που έχουν αποκτηθεί, τη σαφήνεια επεξήγησης αρχών και τεχνικών, καθώς και την ποιότητα του υποστηρικτικού υλικού έλαβαν τη χαμηλότερη βαθμολογία. Η σημαντική μεταβλητότητα στη βαθμολογία μεταξύ των μαθημάτων αποδεικνύει ότι υπάρχει περιθώριο για σημαντικές βελτιώσεις.

*Συμπέρασμα:* Η επιτυχής εφαρμογή ενός συστήματος αξιολόγησης του μεταπτυχιακού προγράμματος προσφέρει σημαντικές πληροφορίες και στοιχεία για τη συνεχή βελτίωσή του.

*Λέξεις Κλειδιά:* Αξιολόγηση, Μεταπτυχιακό, Ιατρική εκπαίδευση.

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