

OCCUPATIONAL AND ENVIRONMENTAL HEALTH POLICY

SELF-ASSESSMENT OF THE COMPETENCES IN OCCUPATIONAL MEDICINE AS AN INSTRUMENT FOR IMPROVING POSTGRADUATE TRAINING*

ANDRZEJ BOCZKOWSKI

Education Quality Analyses Unit
The Nofer Institute of Occupational Medicine
Łódź, Poland

Key words: Competences in occupational medicine, Post-graduate training, Instruments of education quality assessment

Abstract. The main goal of the postgraduate training in occupational medicine is to make already experienced students develop appropriate competences to deal with health problems existing and emerging in the realities of different spheres of occupational health. The task requires checking on and evaluation of the students' learning process and its results.

Thirteen types of competence transmitted to the students were made the points of reference in a special self-assessment questionnaire. The respondents were asked to assess the contribution of particular lectures and seminars to the acquirement or improvement of each type of competence. The results obtained in a group of students suggest that some modifications and improvements in the educational objectives and programmes should be introduced.

THE METHOD AND RESULTS OF THE STUDY

The main goal of the postgraduate training in occupational medicine is to make already professionally experienced students develop appropriate competences** to deal with health problems existing and emerging in the area of occupational health.

*This work has been performed under the Strategic Governmental Research Programme (SPR-1) 'Health and safety in the work environment', research project No. SPR 05.13.4 'Development and implementation of instruments of education quality assessment in the areas of occupational medicine and occupational hygiene'. The modified version of the paper presented at the 6th International Conference 'Quality and Efficiency: Improvement of Competencies' organised by the ICOH Scientific Committee on Education and Training in Occupational Health, held in Cancun, Mexico, 12–14 October 1999.

**Professional competence may be defined as the ability to carry out a certain professional function, which is made up of a set of professional practices or tasks. Competence requires knowledge, observable mechanical and/or intellectual skills, appropriate attitudes and experience.

The task requires checking on and evaluation of the students' learning process and its results, as well as of professional qualifications of teaching staff*.

In Poland, according to medical specialisation regulations the responsibilities of an occupational medicine specialist were, until the recent changes**, as follows:

1. to carry out prophylactic medical examinations in a view of identifying contraindications for a given job and possible harmful effects of exposure to hazards present in the work environment;

2. to examine the health status, and supervise the working conditions of the employees, trainees, handicapped persons, and pregnant women;

3. to ensure the evaluation of the microclimatic conditions and the physical effort required at individual workposts;

4. to assess the quality of the work environment, and the degree of risk posed by harmful environmental factors to the employees, and suggest preventive measures to reduce their adverse effects on the workers' health;

5. to identify and treat any occupational disease, or ailment connected with a particular job or being the result of exposure in a given work environment;

6. to administer first aid to victims of occupational accidents and cases of sudden illness at work;

7. to initiate and supervise medical rehabilitation, and the employees' fitness for the job;

8. to introduce protective vaccination of all employees who are under the preventive care;

9. to analyse the causes of all accidents at work and of occupational diseases, as well as the health condition of those under the preventive care;

10. to analyse and evaluate the health safety of the newly introduced or modernised technologies, microclimatic conditions, and the degree of static and dynamic physical effort required at individual workposts;

11. to pronounce medical opinions and issue certificates, decisions, or review applications for disability pension, employment, or legal proceedings;

12. to initiate, prepare, and carry out programmes of health promotion and health education in workplaces, and train the employees in matters of health protection in the work environment;

13. to collaborate with the employers in planning the work schemes, organisation of the workplaces and working conditions, and to ensure optimum standards of work hygiene, physiology and ergonomics.

*The teaching staff face a serious problem resulting from the specificity of post-graduate training in the course of which the new spheres of competence have to be transmitted and incorporated into the competence already possessed by the trainees, while at the same time their knowledge and skills acquired earlier have to be improved, refreshed, revised, etc. Moreover, the impact of the experience and attitude components is much stronger in the post- than in the undergraduate training. All these aspects need to be reflected in the curricula, teaching methods, and assessment procedures.

**Introduced in the winter 1999/2000 following the recommendations of the expert committee established by the National Consultant in Occupational Medicine.



In this paper the quality assessment procedures concerning postgraduate training in the field of occupational medicine are presented. The quality of training is understood here as the effectiveness in transmitting/acquiring competences*. The assessment procedure consists of two instruments:

1. the questionnaire for self-assessment of the new competence gained; and
2. the form for thorough assessment of the contribution of particular subject courses and didactic units to the acquisition and/or improvement of different spheres of professional competence**.

A two-stage assessment procedure is addressed to the students of occupational medicine post-graduate specialisation training***. Firstly, the respondents are asked to **assess generally** the improvement in their professional competence in different spheres resulting from the participation in the training process. Secondly, they **assess individual subject courses, including their didactic units** in the context of different types of professional competences.

The application, of this procedure and the preliminary findings are discussed on the basis of the material gathered and analysed at the end of the postgraduate specialisation training cycle in The Nofer Institute of Occupational Medicine (January-February 1999).

In the first part of the assessment procedure, the respondents answered – anonymously – two questions aimed to define the difference in perceiving their professional competences **before** and **after** the training cycle***. The answers – scores from 1 ('not sufficient' or 'very low') to 5 ('fully sufficient' or very high) were marked in the appropriate column of the table in which particular types of professional competence in occupational medicine were also enumerated (Fig. 1 – the original form used in our study). Then for each type of the competence, the **competence increase index** (CII) was calculated, being the average of individual differences between the score in column B and that in column A. This index shows how and the extent to which the training programme as a whole contributed to the improvement of particular types of competence in terms of acquiring new knowledge and skills, enlarging competences already possessed etc. One should remember that CII reflects the respondents' subjective judgement, but we assume that there is some correlation between these judgement and objective development of competences.

The results of the first part of the assessment procedure (self-assessment of the competences acquired during the training cycle) are shown in Table 1.

* This is one of the five basic approaches to the quality of education. The others four are: (1) tending to perfection, (2) gaining externally defined threshold standards, (3) effectivity (value for money) and (4) dissemination of good practice (1)

** An inspiring example or standard to follow was the form developed by G.P. Loos for self-assessment of the competence gained by the graduates of schools of public health (2).

*** This assessment procedure has three basic areas of application: (1) **the teaching staff** could use it to find out whether a given set of classes (subject, course) does provide competence according to the programme and to what degree particular competence have been acquired; (2) **the students** – to assess the extent and intensity of the acquired knowledge, skills, attitudes and experience; (3) **the management of the training institution** could use it for internal reviewing of the content, scope, and degree of implementation of the particular elements of a training programme.

**** This part of the assessment procedure was filled in satisfactorily by 38 respondents.

W poniższej tabeli wymienione są zakresy wiedzy i umiejętności, jakie powinien opanować lekarz medycyny pracy.

Pytanie A:

Jak ocenił(a)by P. poziom swoich kompetencji w ramach każdego z tych zakresów **przed rozpoczęciem kursu „Medycyna pracy – kurs podstawowy” w Instytucie Medycyny Pracy w Łodzi?**

Prosimy o oceny w skali „szkolnej” – od 1 do 5, gdzie „1”: oznacza bardzo niski poziom kompetencji (graniczący z ich brakiem), zaś „5”: – poziom najwyższy z możliwych. Oceny prosimy wpisać do odpowiednich rubryk kolumny A.

Pytanie B:

A jak ocenia P. poziom swojej wiedzy i swoich umiejętności (w ramach każdego z wymienionych w tabeli zakresów) **obecnie, tzn. po ukończeniu kursu?**

Podobnie jak przy pytaniu A prosimy o oceny w skali „szkolnej” – od 1 do 5, gdzie „1” oznacza bardzo niski poziom kompetencji (graniczący z ich brakiem), zaś „5” – poziom najwyższy z możliwych. Oceny prosimy wpisać do odpowiednich rubryk kolumny B.

Zakresy wiedzy/umiejętności (rodzaje kompetencji)	A	B
1. Wykonywanie badań profilaktycznych – wstępnych, okresowych, kontrolnych i końcowych, w celu ujawnienia przeciwwskazań do podjęcia pracy i skutków narażenia na szkodliwość środowiska pracy		
2. Badanie kwalifikacji zdrowotnych i nadzór nad warunkami pracy osób zatrudnionych, uczniów odbywających praktykę zawodową, niepełnosprawnych i kobiet ciężarnych		
3. Ocena warunków mikroklimatycznych oraz ocena stopnia obciążenia wysiłkiem fizycznym (statycznym i dynamicznym) na stanowiskach pracy		
4. Ocena jakości środowiska pracy i stopnia narażenia pracowników na wpływ szkodliwych czynników środowiskowych oraz formułowanie wniosków profilaktycznych, zmierzających do ograniczenia negatywnych skutków zdrowotnych tych czynników i do zapewnienia bezpiecznych warunków pracy		
5. Rozpoznawanie i leczenie chorób zawodowych, zespołów objawowych i dolegliwości związanych z wykonywaniem określonego zawodu (pracy) lub wynikających z pozostawania w danym środowisku pracy		
6. Udzielanie pierwszej pomocy ofiarom wypadków w pracy i nagłych zachorowań w miejscu pracy		
7. Inicjowanie i nadzorowanie rehabilitacji zdrowotnej i zawodowej pracowników		
8. Prowadzenie szczepień ochronnych pracowników objętych opieką profilaktyczną		
9. Analizowanie przyczyn wypadków przy pracy i chorób zawodowych oraz stanu zdrowia osób objętych opieką profilaktyczną		
10. Dokonywanie analiz i ocena bezpieczeństwa (dla zdrowia) nowowprowadzonych lub modernizowanych technologii produkcyjnych, warunków mikroklimatycznych oraz stopnia obciążenia wysiłkiem fizycznym i dynamicznym na stanowiskach pracy		
11. Przygotowywanie opinii, świadectw, orzeczeń oraz wniosków do celów inwalidztwa, zatrudnienia i sądownictwa		
12. Inicjowanie, opracowywanie i realizowanie programów promocji zdrowia i oświaty zdrowotnej w zakładach pracy, i prowadzenie szkoleń pracowników oraz odpowiednich służb pracodawców w zakresie ochrony zdrowia w środowisku pracy		
13. Współdziałanie z pracodawcami w zakresie planowania ilości pracy, organizacji stanowisk i warunków pracy, optymalnych z punktu widzenia wymogów higieny pracy, fizjologii pracy i ergonomii		

Fig. 1. The first part of the assessment procedure concerning the effectiveness of the post-graduate training in occupational medicine: the questionnaire for self-assessment of acquired competences.



Tabela 1. The results of the first part of the assessment procedure (self-assessment of the increase in professional competences)

Types of competences ordered according to the increase index	Competence increase index	Rank
To carry out prophylactic medical examinations in a view of identifying contraindications for a given job and possible harmful effects of exposure to hazards present in the work environment	1.95	1
To examine the health status, and supervise the working conditions of the employees, trainees, handicapped persons, and pregnant women	1.69	2
To ensure the evaluation of the microclimatic conditions and the physical effort required at individual workposts	1.58	3
To assess the quality of the work environment, and the degree of risk posed by harmful environmental factors to the employees, and suggest preventive measures to reduce their adverse effects on the workers' health	1.53	4
To identify and treat any occupational disease, or ailment connected with a particular job or being the result of exposure in a given work environment	1.45	5
To administer first aid to victims of occupational accidents and cases of sudden illness at work	1.42	6
To initiate and supervise medical rehabilitation, and the employees' fitness for the job	1.37	7
To introduce protective vaccination of all employees who are under the preventive care	1.32	8
To analyse the causes of all accidents at work and of occupational diseases, as well as the health condition of those under the preventive care	1.24	9
To analyse and evaluate the health safety of the newly introduced or modernised technologies, microclimatic conditions, and the degree of static and dynamic physical effort required at individual workposts	1.19	10
To initiate, prepare, and carry out programmes of health promotion and health education in workplaces, and train the employees in matters of health protection in the work environment	1.18	11
To initiate, prepare, and carry out programmes of health promotion and health education in workplaces, and train the employees in matters of health protection in the work environment	0.82	12
To collaborate with the employers in planning the work schemes, organisation of the workplaces and working conditions, and to ensure optimum standards of work hygiene, physiology and ergonomics	0.76	13

The second part of the assessment procedure – the form for thorough assessment of the contribution of particular subject courses and didactic units to the acquisition and/or improvement of different types of professional competence – is based on a table in which side-headed are the various types of competence in occupational medicine to be acquired/improved by the students. In the heading of the table, five subject courses aimed at transmitting particular types are listed (Fig. 2 presents the original form used in our study). The programme of a 2-month postgraduate training included five subject courses containing different numbers of didactic units devoted to:

Dla każdego z zakresów wiedzy/umiejętności w ramach poszczególnych bloków tematycznych prosimy wskazać 5 takich zajęć (wykładów, ćwiczeń, seminariów), które, P. zadaniem, najbardziej przyczyniły się do nabycia (uzupełnienia, odświeżenia) przez P. wiedzy/umiejętności w danym zakresie.

UWAGA: PRZY KAŻDYM ZAKRESIE WIEDZY/UMIEJĘTNOŚCI PROSIMY WZIĄĆ POD UWAGĘ ZAŁĘGĄ ZE WSZYSTKICH BLOKÓW TEMATYCZNYCH

W odpowiednie rubryki prosimy wpisać nie więcej niż 5 numerów zajęć z danego bloku tematycznego – korzystając z listy zajęć z pytań 2 tej ankiety.

Zakresy wiedzy/umiejętności	Bloki tematyczne				
	Higiena pracy – czynniki fizyczne	Higiena pracy – czynniki chemiczne	Fizjologia i psychologia pracy	Epidemiologia, organizacja, aspekty prawne	Profilaktyka medyczna, patologia zawodowa
1. Wykonywanie badań profilaktycznych – wstępnych, okresowych, kontrolnych i końcowych, w celu ujawnienia przeciwwskazań do podjęcia pracy i skutków narażenia na szkodliwość środowiska pracy					
2. Badanie kwalifikacji zdrowotnych i nadzór nad warunkami pracy osób zatrudnionych, uczniów odbywających praktykę zawodową, niepełnosprawnych i kobiet ciężarnych					
3. Ocena warunków mikroklimatycznych oraz ocena stopnia obciążenia wysiłkiem fizycznym (statycznym i dynamicznym) na stanowiskach pracy					
4. Ocena jakości środowiska pracy i stopnia narażenia pracowników na wpływ szkodliwych czynników środowiskowych oraz formułowanie wniosków profilaktycznych, zmierzających do ograniczenia negatywnych skutków zdrowotnych tych czynników i do zapewnienia bezpiecznych warunków pracy					
5. Rozpoznawanie i leczenie chorób zawodów, zespołów objawowych i dolegliwości związanych z wykonywaniem określonego zawodu (pracy) lub wynikających z pozostawania w danym środowisku pracy					
6. Udzielanie pierwszej pomocy ofiarom wypadków w pracy i nagłych zachorowań w miejscu pracy					
7. Inicjowanie i nadzorowanie rehabilitacji zdrowotnej i zawodowej pracowników					
8. Prowadzenie szczepień ochronnych pracowników objętych opieką profilaktyczną					
9. Analizowanie przyczyn wypadków przy pracy i chorób zawodowych oraz stanu zdrowia osób objętych opieką profilaktyczną					
10. Dokonywanie analiz i ocena bezpieczeństwa (dla zdrowia) nowowprowadzonych lub modyfikowanych technologii produkcyjnych, warunków mikroklimatycznych oraz stopnia obciążenia wysiłkiem fizycznym i dynamicznym na stanowiskach pracy					
11. Przygotowywanie opinii, świadczeń, orzeczeń oraz wniosków do celów inwalidztwa, zatrudnienia i sądownictwa					
12. Inicjowanie, opracowywanie i realizowanie programów promocji zdrowia i oświaty zdrowotnej w zakładach pracy, i prowadzenie szkoleń pracowników oraz odpowiednich służb pracodawców w zakresie ochrony zdrowia w środowisku pracy					
13. Współdziałanie z pracodawcami w zakresie planowania ilości pracy, organizacji, stanowisk i warunków pracy, optymalnych z punktu widzenia wymogów higieny pracy, fizjologii pracy i ergonomii					

Fig. 2. The second part of the assessment procedure: the form of detailed assessment of the contribution of particular subject courses and didactic units to the acquisition and/or improvement of different types of professional competence in occupational medicine.

1. Occupational hygiene — physical factors (9 units)
2. Occupational hygiene — chemical factors (15 units)
3. Physiology and psychology of work (14 units)
4. Epidemiology, organisation, and occupational health law (14 units)
5. Medical prevention, and occupational pathology (53 units).

In the cells created by crossing competences and courses titles, the students identified the numbers of didactic units (from the list attached to the questionnaire) considered by them as having the highest contribution to the acquisition or/and development of a given type of competence*. The fact of choosing a given unit was considered as its positive (distinctive) assessment. The lack of the unit number in a cell was considered as the respondents' negative opinion on its contribution to the acquisition/improvement of a given type of competence.

Tables 2, 3 and 4 present the results of the quality assessment of individual courses. The detailed analysis of the assessment procedure of didactic units contained in particular courses will be the subject of another paper.

Table 2 presents the indices of the intensity and scope of the contribution of particular courses to the acquisition/improvement of different competences in occupational medicine. They are elaborated on the basis of responses formulated by the course participants.

Index I refers to the **scope** of contribution of a given subject course. In each case it is **the per cent of didactic units** (lectures, seminars, practical exercises) pointed out by the respondents — with different frequency — as useful in acquiring/improving of a given type of competence.

Index II refers to the **intensity** of contribution of a given subject course. It is **the per cent of all scores** given to the units in individual subject course considered as useful in acquiring/improving a given type of competence.

Generally, we can see that the greater scope of the contribution of particular courses perceived by their participants, the higher intensity of this contribution. This suggests a need to generalise or synthesise the two indices. First, the average index of contribution scope was counted for each course. Then all indices of contribution scope (taking into consideration also intensity indices) were divided into three general types of perceived contribution (or usefulness) of the courses to the acquisition/improvement of different types of professional competence:

- (1) **high contribution** (indices of scope considerably higher than average + relatively high indices of intensity);
- (2) **medium contribution** (indices of scope near average + not so high, rather small indices of intensity);
- (3) **small contribution** (indices of scope considerably lower than average + relatively low indices of intensity).

Tables 3 and 4 presents, in two complementary configurations, the results of analysis performed with the help of this typology.

* This part of the assessment procedure was filled in satisfactorily by 15 respondents.



Tabela 2. Intensity and scope of the contribution of particular subject courses to the acquisition/improvement of different types of competence in occupational medicine — in the students' opinion (index I: the per cent of didactic units pointed out by the respondents as useful; index II: the per cent of all pointing scores given to the units in individual subject course considered as useful in acquiring/improving a given type of competence)

Types of competence	Subject courses													
	Occupational hygiene — factors:				Physiology and psychology of work				Epidemiology, occupational OH law				Medical prevention, pathology	
	physical		chemical		of work		OH law		I		II		I	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Indices:														
1. To carry out prophylactic medical examinations in a view of identifying contraindications for a given job and possible harmful effects of exposure to hazards present in the work environment	100	18	73	16	50	11	57	13	26	9				
2. To examine the health status, and supervise the working conditions of the employees, trainees, handicapped persons, and pregnant women	89	10	60	9	71	11	36	9	23	8				
3. To ensure the evaluation of the microclimatic conditions and the physical effort required at individual workposts	56	10	40	8	64	12	36	7	15	6				
4. To assess the quality of the work environment, and the degree of risk posed by harmful environmental factors to the employees, and suggest preventive measures to reduce their adverse effects on the workers' health	89	11	73	13	71	11	43	9	25	9				
5. To identify and treat any occupational disease, or ailment connected with a particular job or being the result of exposure in a given work environment	78	8	60	10	43	7	50	8	36	11				
6. To administer first aid to victims of occupational accidents and cases of sudden illness at work	11	1	40	7	21	3	14	2	25	8				
7. To initiate and supervise medical rehabilitation, and the employees' fitness for the job	33	4	27	5	38	6	29	5	17	5				
8. To introduce protective vaccination of all employees who are under the preventive care	11	1	7	1	—	—	29	6	11	3				
9. To analyse the causes of all accidents at work and of occupational diseases, as well as the health condition of those under the preventive care	67	8	33	6	57	7	43	7	17	8				
10. To analyse and evaluate the health safety of the newly introduced or modernised technologies, microclimatic conditions, and the degree of static and dynamic physical effort required at the individual workposts	78	10	67	8	93	11	50	8	28	8				
11. To pronounce medical opinions and issue certificates, decisions, or review applications for disability pension, employment, or legal proceedings	78	8	40	5	86	9	36	10	30	12				
12. To initiate, prepare, and carry out programmes of health promotion and health education in workplaces, and train the employees in matters of health protection in the work environment	11	1	27	4	36	5	43	8	11	5				
13. To collaborate with the employers in planning the work schemes, organisation of the workplaces and working conditions, and to ensure optimum standards of work hygiene, physiology and ergonomics	67	10	33	7	57	9	43	9	25	8				

Tabela 3. The contribution of particular courses to the acquisition/development of different types of competence in the opinion of the participants

Types of competence	Contribution of the course		
	high	medium	small
1. To carry out prophylactic medical examinations in a view of identifying contraindications for a given job and possible harmful effects of exposure to hazards present in the work environment	Occup. hygiene — physical factors Occup. hygiene — chemical factors Epidemiology/organisation/OH law	Physiology and psychology of work Med prophylaxis/occup.pathology	
2. To examine the health status, and supervise the working conditions of the employees, trainees, handicapped persons, and pregnant women	Occup. hygiene — physical factors Occup. hygiene — chemical factors Physiology and psychology of work	Epidemiology/organisation/OH law Med prophylaxis/occup.pathology	
3. To ensure the evaluation of the microclimatic conditions and the physical effort required at individual workpost		Occup. hygiene — physical factors Occup. hygiene — chemical factors Epidemiology/organisation/OH law Med. prophylaxis/occup. pathology	Med. prophylaxis/occup. pathology
4. To assess the quality of the work environment, and the degree of risk posed by harmful environmental factors to the employees, and suggest preventive measures to reduce their adverse effects on the workers' health	Occup. hygiene — physical factors Occup. hygiene — chemical factors Physiology and psychology of work		
5. To identify and treat any occupational disease, or ailment connected with a particular job or being the result of exposure in a given work environment	Occup. hygiene — physical factors Occup. hygiene — chemical factors Epidemiology/organisation/OH law Med. prophylaxis/occup. pathology		Physiology and psychology of work
6. To administer first aid to victims of occupational accidents and cases of sudden illness at work		Occup. hygiene — chemical factors Med prophylaxis/occup.pathology	Occup. hygiene — physical factors Physiology and psychology of work Epidemiology/organisation/OH law Occup. hygiene — physical factors Occup. hygiene — chemical factors Physiology and psychology of work Epidemiology/organisation/OH law Occup. hygiene — physical factors Occup. hygiene — chemical factors Med. prophylaxis/occup. pathology
7. To initiate and supervise medical rehabilitation, and the employees' fitness for the job			
8. To introduce protective vaccination of all employees who are under the preventive care		Occup. hygiene — physical factors Med prophylaxis/occup.pathology Med prophylaxis/occup.pathology	Physiology and psychology of work
9. To analyse the causes of all accidents at work and of occupational diseases, as well as the health condition of those under the preventive care			
10. To analyse and evaluate the health safety of the newly introduced or modernised technologies, microclimatic conditions, and the degree of static and dynamic physical effort required at the individual workposts	Occup. hygiene — physical factors Occup. hygiene — chemical factors Physiology and psychology of work Epidemiology/organisation/OH law Med. prophylaxis/occup. pathology	Occup. hygiene — physical factors Physiology and psychology of work Epidemiology/organisation/OH law Med. prophylaxis/occup. pathology	Occup. hygiene — physical factors Physiology and psychology of work Epidemiology/organisation/OH law Occup. hygiene — physical factors Occup. hygiene — chemical factors Med. prophylaxis/occup. pathology
11. To pronounce medical opinions and issue certificates, decisions, or review applications for disability pension, employment, or legal proceedings	Occup. hygiene — physical factors Physiology and psychology of work Med prophylaxis/occup pathology	Occup. hygiene — chemical factors Epidemiology/organisation/OH law	Occup. hygiene — physical factors Occup. hygiene — chemical factors Physiology and psychology of work Med. prophylaxis/occup. pathology Occup. hygiene — chemical factors
12. To initiate, prepare, and carry out programmes of health promotion and health education in workplaces, and train the employees in matters of health protection in the work environment		Epidemiology/organisation/OH law	
13. To collaborate with the employers in planning the work schemes, organisation of the workplaces and working conditions, and to ensure optimum standards of work hygiene, physiology and ergonomics		Occup. hygiene — physical factors Physiology and psychology of work Epidemiology/organisation/OH law Med prophylaxis/occup.pathology	

Table 4. The types of competence (numbers from the above list) served by particular courses with different scope/intensity in the opinion of the participants

Courses	Contribution to particular competences		
	high	medium	low
Occupational hygiene — physical factors	1, 2, 4, 5, 10, 11	3, 9, 13	6, 7, 8, 12
Occupational hygiene — chemical factors	1, 2, 4, 5, 10	3, 6, 11	7, 8, 9, 12, 13
Physiology and psychology of work	2, 3, 4, 10, 11	1, 9, 13	5, 6, 7, 12
Epidemiology, organization, OH law	1, 5, 10	2, 3, 4, 9, 11, 12, 13	6, 7, 8
Medical prophylaxis, occup. pathology	5, 10, 11	1, 2, 4, 6, 7, 9	3, 8, 12

DISCUSSION

If we know the **normative pattern** of detailed interrelations between the types of competence and the course (on the basis of existing education objectives, programmes etc.), there arise three possibilities of interpretation:

- (1) the contribution is too small (should be greater) — this suggests appropriate changes in the programme content and, possibly, in the teaching procedures;
- (2) the contribution is adequate (even in the case of low scores on average);
- (3) the contribution is too high (should be smaller — with all the implications to the programme, teaching procedures etc.).

If we do not have such a normative pattern (and this is the case in our study) such an interpretation of the results obtained is impossible. Assessing the whole programme of the training (at the course level), we can only say that in the collective consciousness of the respondents certain types of professional competence in occupational medicine are served **more** by this programme (but it is difficult to say whether they are served **better**) and other types of competence are served **less** (but one cannot say whether they are served **worse**).

More than others are served the types of competence with numbers 10 (the first ranking place), 5 (the second place) and 1, 2, 4, and 11 (*ex aequo* third place in the ranking).

Served on medium level are types of competence: 3, 9 and 13.

Less than others are served types of competence: 6, 7, 12 and 8.

CONCLUSION

Assuming that competence types described above are well formulated, comprehensive, exhaustive etc., one could think about modification of some courses — their contents, time dimension and so on.

But one can also take another assumption that the content of the courses is well selected, units are well prepared and well taught, that they correspond



with the occupational health needs and demands, as well as with demands of our postgraduate students. In this case, perhaps, the competences have been formulated inappropriately and should be modified or even reformulated.

The in-depth interpretation of these typologies and, if necessary, organisational recommendations resulting from their application are possible only in the context of detailed analysis of educational objectives and programmes which actually goes far beyond the scope of this paper.

REFERENCES

1. Frazer MJ. Issues of Quality. Higher Education in Europe XX (1–2): 1995.
2. Manual and Assessment Matrix. Conducting a Self-Assessment Study of Minimum Competency Levels for Public Health Graduates, ed. GP Loos. Asia Pacific Acad., Consortium for Public Health, Sept. 1994.

Received for publication: March 15, 2000

Approved for publication: May 9, 2000

