# TEACHING ENGLISH MEDICAL TERMINOLOGY TO STUDENTS OF MEDICINE: THE SOONER, THE BETTER

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***Summary:***

***Aim.*** *To compare the impact of the introductory part of the Medical English course at the University of Zagreb Medical School in three different student groups, in view of the recent curricular changes concerning the Bologna process.*

***Method.*** *In the academic year 2005/06, three student groups (students of the Medical Studies in English program, regular first- and second-year students) took the same course concerning the basics of the morphology of medical terms. At the beginning and at the end of the course, each group was given the same questionnaire testing vocabulary at the levels of recognition and production. The difference between the results obtained at the outset and upon the completion of the course expressed the extent of vocabulary acquisition, calculated for each term and as mean values for each group separately.*

***Results.*** *In the vertical, recognition vs production, comparison of results, all groups attained higher percentages in the recognition part of the questionnaire. Horizontally, the best results in both parts were achieved by the Medical Studies in English (MSE) group. Concerning the regular first- and second-year groups, the former did markedly better in the recognition part, while the difference in the production part was only slightly in their favor.*

***Conclusion.*** *The considerably better results attained by the MSE group are probably due to the chronologically concentrated teaching and evaluation of the course, as well as to the students' high motivation. Regarding the first- and second-year groups, it was shown that the course impact was definitely greater for the first-year group, a result that supports the current changes in the curriculum concerning the Medical English course and serves as a hopeful pointer to our future efforts in that direction.*

***Key words:*** *Medical English, curricular changes, Bologna process, morphology of medical terms, vocabulary acquisition at the levels of recognition and production*

## Introduction

This research was prompted by the fact that, due to the implementation of extensive curricular changes undertaken to bring the teaching into alignment with the requirements of the Bologna process, at the University of Zagreb Medical School in the academic year 2005/06 the same course, Introduction to Medical English, was taught three times, for different student populations. Since such circumstances are unlikely to be repeated in the near future, it seemed opportune to compare the achievements of the three student groups in order to find out if there were any fundamental differences among them (horizontal comparison), and, if that was the case, how those differences might be explained. For this purpose, at the beginning and at the end of the course, the students were presented with the same questionnaire, designed to show the extent of vocabulary acquisition by each group at two levels, recognition and production (vertical comparison).

The first group of students to take the course were those enrolled into the Medical Studies in English program, started in the academic year 2003/04 as a new addition to the curriculum of the Zagreb Medical School. This program of studies, comparable to similar ones offered by many medical schools in neighbouring countries, was conceived as a 12-semester undergraduate course of studies leading to the MD degree, designed so as to conform with the global essential requirements and standards for undergraduate medical education, which is specially relevant at the present moment of Croatia's prospective membership in the European Union, where the mobility of students is a key concept of every study program in agreement with the Bologna process. The program is aimed at foreign or Croatian diaspora high-school or college graduates who are either native speakers of English or have a certifiable knowledge of the language at the necessary level to participate in the teaching process conducted entirely in English.

For this group, due to the small number of enrolled students (19), Introduction to Medical English was taught as a 5-day, 20-hour crash course.

The second group of students were regular first-year students, enrolled according to the modified program of studies adapted to the requirements of the Bologna process, and scheduled to take 20 hours of Medical English during each of their six years of study, a modification of the former 90-hour course taught in the second and third years of study. The necessity to extend the teaching of Medical English through all six years was recognized and implemented by all four Croatian medical schools (Zagreb, Split, Rijeka, Osijek). The introductory 20 hours of seminars dealing with the morphology of medical terms the first-year students took this year were extended through 10 weeks of the winter semester. The material was basically the same as for

the former group, only slightly adapted for a non-native-speaker audience. The research involved 114 first-year students.

The third group was constituted by 118 second-year students who took their Medical English classes according to the old program. Thus the part of the course which was the object of this research was only the introductory section of their 30-hour course of Medical English seminars which extended through a period of 15 weeks in the summer semester.

Naturally, the main focus of interest was to compare the results attained by the similarly sized   first- and second-year student groups, particularly in the light of the above-mentioned changes concerning the Medical English curriculum. It was assumed that a course starting in the first and continuing through all six years of study, thereby establishing, as far as feasible, a correlation with the material taught in the main subjects, would provide a better basis for the facilitation of the students' usage of their professional literature in English, which is the principal aim of the course.

## Method

In order to make the questionnaire presented to the students before and after the course understandable, here is a brief outline the basic structure of medical terms and the importance of understanding the principles of their morphology.

A medical term usually consists of two or more basic elements, i.e. word roots (or combining forms, which are roots together with a vowel, usually o, that links the root to the suffix), suffixes and prefixes. (Although these are prevalently of Greek and Latin origin, they are often spelt and always pronounced the English way, which tends to be a marked point of interference for Croatian students, who are still required to master the entire anatomical nomenclature in Latin.) Thus each element, by carrying part of the meaning, contributes to the meaning of the complete term. In other words, you can arrive at the meaning of a medical term by breaking it down into its components and "adding up" their separate semantic contents. Consequently, by combining different parts according to certain rules, you can produce a vast number of new meaningful units.

Since the number of all roots, prefixes and suffixes currently in use is huge (the latest edition of Dorland's Medical Dictionary defines more than 120,000 terms), a very limited choice had to be made for the purpose of our course, but one which would still cover the most basic and frequently used terms. Thus around 60 word roots, covering the main organs and tissues, were chosen. Together with the most frequent suffixes (about 50) and prefixes

(about 80), divided into manageable semantic categories, they alone provide hundreds, if not thousands, of possible combinations.

Here it must be emphasized that vocabulary acquisition in itself is not the main goal of the course, but rather providing the students with a "tool" for vocabulary analysis which is supposed to enable them to deal with their professional vocabulary in whichever manner a certain situation requires, whether it is just comprehension of a given term or the production of terms as the need arises.

The questionnaire consisted of two parts: the first was a list of 14 common medical terms whose definitions the students were required to complete, while the second part provided 14 definitions of terms which the students were asked to produce. Thus in the first part the students had to recognize the constituent word elements and provide their English counterparts, whereas the second part required them to "translate" the highlighted parts of the definitions into word elements and so produce the medical terms themselves. The examples were carefully chosen so as to contain a representative selection from all the categories of word elements that had been dealt with in the course.

**I. Complete the short definitions of the following terms:**

1. **cephalalgia** - _____ in the _____

2. **leukopenia** - _____ number of _____

3. **angiogram** - _____ of the _____

4. **ophthalmoscopy** - procedure of _____ the _____

5. **hysterectomy** - _____ of the _____

6. **rhinoplasty** - _____ of the _____

7. **cystocele** - _____ of the _____

8. **epigastric** - pertaining to _____ the _____

9. **intercostal** - pertaining to _____ the _____

10. **bradycardia** - condition of _____ _____

11. **postmortal** - occurring _____ _____

12. **dyspnea** - condition of _____ _____

13. **tetradactyly** - condition of having _____ _____

14. **primipara** - woman who _____

**II. Produce the appropriate medical term from the given definitions:**

15. irrational **fear** of **many** things _____

16. **rapid breathing** _____

17. **red** blood **cell** _____

18. **below** the **kneecap** _____

19. a **contraction** of the **intestine** _____

20. **radiographic** examination of the **brain** _____

21. **puncturing** of the **chest** _____

22. **"black"** skin **tumor** _____

23. **instrument** for measuring **lung** capacity _____

24**. surg. opening** from the **colon** to the surface of the body _____

25. **surrounding** the **kidney** _____

26. state due to **insufficient/unbalanced diet** _____

27. consisting of a **single cell** _____

28. **hardening** of the **joints** _____

In the process of the questionnaire evaluation, only complete definitions were taken into account. Minor orthographic errors were disregarded. For each required term/definition, the percentage of correct answers at the beginning of the course was subtracted from the percentage attained at the end of the course by each group, the difference being the achieved result. An overall mean result was calculated for each group.

# Results

**Table 1.** Results, in percent, of the first (recognition) part of the questionnaire for each completed definition with mean acquisition values for each group.

| Complete definition | MSE group (19) | | | 1st year (114) | | | 2nd year (118) | | |
|---|---|---|---|---|---|---|---|---|---|
| | bef. % | after% | diff.% | bef.% | after% | diff.%. | bef.% | after% | diff.% |
| 1. pain in the head | 0.0 | 89.4 | 89.4 | 2.6 | 87.9 | 85.3 | 7.6 | 86.4 | 78.8 |
| 2. deficiency in white blood cells | 5.3 | 89.4 | 84.1 | 68.7 | 95.7 | 27.0 | 78.8 | 91.5 | 12.7 |
| 3. record of blood vessels | 0.0 | 73.6 | 73.6 | 0.0 | 44.4 | 44.4 | 13.6 | 58.5 | 44.9 |
| 4. examination of the eye | 26.3 | 89.4 | 63.1 | 13.1 | 73.1 | 60.0 | 32.2 | 69.5 | 37.3 |
| 5. removal of the uterus | 21.0 | 78.9 | 57.9 | 6.1 | 60.0 | 53.9 | 14.4 | 73.7 | 59.3 |
| 6. reconstruction of the nose | 36.8 | 84.2 | 47.4 | 1.7 | 65.3 | 63.6 | 5.9 | 45.8 | 39.9 |
| 7. hernia of the urinary bladder | 0.0 | 84.2 | 84.2 | 0.0 | 20.9 | 20.9 | 0.0 | 44.1 | 44.1 |
| 8. above the stomach | 5.3 | 94.7 | 89.4 | 0.9 | 70.5 | 69.6 | 7.6 | 46.6 | 39.0 |
| 9. between the ribs | 10.5 | 68.4 | 57.9 | 2.6 | 49.6 | 47.0 | 13.6 | 72.0 | 58.4 |
| 10. slow heartbeat | 5.3 | 100 | 94.7 | 30.5 | 75.7 | 45.2 | 45.8 | 77.1 | 31.3 |
| 11. after death | 94.7 | 100 | 5.3 | 63.5 | 94.8 | 31.3 | 78.8 | 95.8 | 17.0 |
| 12. difficulty breathing | 5.3 | 94.7 | 89.4 | 7.0 | 47.0 | 40.0 | 9.3 | 58.8 | 49.5 |
| 13. having 4 fingers/ toes | 0.0 | 100 | 100 | 33.9 | 94.0 | 60.1 | 43.2 | 89.0 | 45.8 |
| 14. woman giving birth for 1st time | 5.3 | 89.4 | 84.1 | 16.5 | 79.2 | 62.7 | 38.1 | 93.2 | 55.1 |
| **Mean value** | 15.4 | 88.3 | **72.9** | 17.7 | 68.4 | **50.8** | 27.8 | 71.6 | **43.8** |

**Table 2.** Results, in percent, of the second (production) part of the questionnaire for each required term with mean acquisition values for each group.

| Required term | MSE group (19) | | | 1st year (114) | | | 2nd year (118) | | |
|---|---|---|---|---|---|---|---|---|---|
| | bef.% | after% | diff.% | bef.% | after% | diff.% | bef.% | after% | diff.% |
| 15. polyphobia | 5.3 | 78.9 | 73.6 | 0.9 | 33.1 | 32.2 | 1.7 | 40.0 | 38.3 |
| 16. tachypnea/ hyperventilation | 42.1 | 68.4 | 26.3 | 9.6 | 53.1 | 43.5 | 15.3 | 67.0 | 51.7 |
| 17. erythrocyte | 42.1 | 94.7 | 52.6 | 24.6 | 87.7 | 63.1 | 46.6 | 91.5 | 44.9 |
| 18. infra/subpatellar | 10.5 | 63.1 | 52.6 | 1.8 | 50.9 | 49.1 | 0.0 | 64.4 | 64.4 |
| 19. enterospasm | 0.0 | 63.1 | 63.1 | 0.0 | 30.7 | 30.7 | 0.8 | 12.7 | 11.9 |
| 20. encephalography | 5.3 | 52.6 | 47.3 | 11.4 | 41.2 | 29.8 | 23.7 | 44.9 | 21.2 |
| 21. thoracocentesis | 0.0 | 42.1 | 42.1 | 0.0 | 35.1 | 35.1 | 0.0 | 33.1 | 33.1 |
| 22. melanoma | 5.3 | 78.9 | 73.6 | 26.3 | 91.2 | 64.9 | 36.4 | 78.0 | 41.6 |
| 23. spirometer | 0.0 | 10.5 | 10.5 | 13.2 | 31.6 | 18.4 | 15.3 | 73.7 | 58.4 |
| 24. colostomy | 0.0 | 78.9 | 78.9 | 0.0 | 41.2 | 41.2 | 0.0 | 29.7 | 29.7 |
| 25. perinephric/renal | 0.0 | 57.7 | 57.7 | 0.0 | 36.8 | 36.8 | 0.0 | 43.2 | 43.2 |
| 26. malnutrition/ malnourishment | 15.8 | 42.1 | 26.3 | 3.5 | 22.8 | 19.3 | 2.5 | 36.4 | 33.9 |
| 27. uni/monocellular | 26.3 | 78.9 | 52.6 | 5.3 | 64.9 | 59.6 | 10.2 | 78.8 | 68.6 |
| 28. arthrosclerosis | 0.0 | 89.4 | 89.4 | 0.0 | 49.1 | 49.1 | 0.0 | 30.5 | 30.5 |
| **Mean value** | 10.9 | 64.2 | **53.3** | 6.9 | 47.8 | **40.9** | 10.9 | 51.7 | **40.8** |

The ability to recognize a lexical item and remember its meaning is considered to be the basic step in the complex process of vocabulary acquisition in a foreign language, followed by what linguists call retrieval, production, personalization, and, finally, deep prcessing of a word, which involves not only the learner's ability to manipulate its form, but also to correctly process it with collocations, colligation, semantic preference etc.

As our questionnaire focused on recognition (remembering the meaning of a lexical item upon seeing it) and production (saying or writing the word),

the vertical comparison results confirmed the expected higher achievement in the less complex recognition part in all three tested groups.

Horizontally, the overall achievement results in the first part of the questionnaire show a marked difference in favor of the crash course (72.9%) as opposed to the regular student groups (50.8% and 43.8% respectively). Between those two it was the first-year group which attained the better result.

The results of the second, more complex, part of the questionnaire showed smaller differences among the three groups (53.3%, 40.9%, 40.8% respectively).

## Discussion

Although a comparison between the crash course group and the two regular student groups may be questionable due to the considerable difference in the number of students, and the results of a more numerous crash course group may perhaps have been different, the better overall achievement of this group is most probably due to the fact that the rapid and concentrated input of information, evaluated immediately upon completion of the course, expectedly yielded better results. Also, it should not be disregarded that for this group the course in question was one of the very first courses they took and that consequently they were extremely motivated.

However, as our main focus of interest was a comparison of the achievements of the Croatian first- and second-year students in view of the present changes in the curriculum regarding the Medical English course, our initial supposition that the impact of the course would be greater in the first-year students was confirmed by the results of the research. The second-year group, although starting out with better results in both parts of the questionnaire, eventually did not do as well as the first-year group (although the difference in the production part was very small), which is most probably due to the fact that for the first-year students the Medical English course coincided with their anatomy course, part of which is also dedicated to the mastering of terminology, and therefore undoubtedly made the learning process not only easier, but hopefully also more interesting for them. In comparison, for the second-year students there was very little correlation between what they were taught in the Medical English course and their other subjects.

To conclude, it is to be hoped that the new approach to the Medical English curriculum, planned to develop, at least in broad strokes, along the lines of the students' main subjects throughout their six years of study, will continue to give better results in the faculty's synergized efforts.

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# PODUČAVANJE MEDICINSKE TERMINOLOGIJE NA ENGLESKOM ZA STUDENTE MEDICINE: ŠTO PRIJE, TO BOLJE

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## Sažetak

**Cilj:** *Usporediti učinak uvodnoga dijela kolegija Medicinski engleski u trima različitim skupinama studenata Medicinskoga fakulteta Sveučilišta u Zagrebu, posebice s obzirom na promjene u kurikulumu uvedene radi usklađivanja sa zahtjevima Bolonjskoga procesa.*

**Metoda:** *U ak. god. 2005./06. uvodni dio kolegija Medicinski engleski koji se bavi morfologijom medicinskih termina slušale su tri skupine studenata (studenti programa Studija medicine na engleskom, te redoviti studenti 1. i 2. godine). Na početku i kraju kolegija svaka je skupina popunila isti upitnik, test vokabulara na razinama prepoznavanja i produkcije. Razlika postignutih rezultata, izražena u postotcima za svaki pojedinačni termin, te kao ukupna srednja vrijednost za svaku skupinu posebno, pokazatelj je usvojenoga vokabulara.*

**Rezultati:** *Vertikalnom (prepoznavanje vs-produkcija) usporedbom rezultata razvidno je da su sve skupine postigle bolji rezultat u prvom dijelu upitnika kojim se testiralo prepoznavanje termina. Horizontalna usporedba pokazuje da je najbolji rezultat u oba dijela testa postigla skupina Studija medicine na engleskom; od redovitih je studenata skupina 1. godine postigla znatno bolje rezultate u prvom dijelu testa (prepoznavanje), dok je u drugom dijelu (produkcija) razlika u njihovu korist bila tek neznatna.*

**Zaključak:** *Značajno bolji ukupan rezultat skupine studenata Studija medicine na engleskom vjerojatno se može objasniti činjenicom da oni kolegij slušaju vremenski koncentrirano, u bloku koji uključuje i samu evaluaciju, te njihovom visokom motiviranošću. Što se tiče skupina 1. i 2. godine, rezultati upućuju na to da je učinak nastave veći na prvoj godini, što je činjenica koja ide u prilog tekućim promjenama kurikuluma te može biti smjernicom za naš budući rad.*

**Ključne riječi:** *Medicinski engleski, promjene kurikuluma, Bolonjski proces, morfologija medicinskih termina, usvajanje vokabulara na razini prepoznavanja i produkcije*