

9. Руснак, І. С. Розвиток українського шкільництва в Канаді (кінець XIX–XX ст.) [Текст]: автореф. дис. ... д-ра пед. наук / І. С. Руснак; Інститут педагогіки АПН України. – К., 2000. – 39 с.
10. Nedashkivska, A. Ukrainian Language Education Network: A Case of Engaged Scholarship [Text] / A. Nedashkivska, O. Bilash // Engaged Scholar Journal: Community-Engaged Research, Teaching and Learning. – 2015. – Vol. 1, Issue 1. – P. 107–131. doi: 10.15402/esj.2015.1.a07
11. The Canadian Multiculturalism ACT [Electronic resource]. – 1988. – Available at: www.pch.gc.ca/multi/policy/act_e.chtml
12. Білаш, О. Як змінилася праця українських вчителів під впливом співпраці з канадськими вчителями? [Текст]: зб. мат. II Міжнар. наук.-пр. конф. / О. Білаш, І. Кобель // Українська мова у світі. – Львів: Видавництво Львівської політехніки, 2012. – С. 35–55. Режим доступу: <http://ena.lp.edu.ua:8080/xmlui/handle/ntb/16976?show=full>
13. Національна концепція співпраці із закордонними українцями [Текст]: інформ.-аналітичні мат. – Закордонне українство: сучасний стан та перспективи співпраці. – К., 2009. – 63 с.
14. Хилько, Ю. Феномен обдарованості в соціально-ціннісній еволюції шкільної освіти Канади (XX – XXI ст.) [Електронний ресурс]: мат. III Міжнар. наук.-пр. конф. / Ю. Хилько. – Гаспра, 2010. – Режим доступу: <http://www.twirpx.com/file/1193200/>

*Рекомендовано до публікації д-р пед. наук Вовк М. П.
Дата надходження рукопису 12.04.2017*

Машкова Інна Миколаївна, старший викладач, кафедра іноземних мов, ДВНЗ «Київський національний економічний університет імені Вадима Гетьмана», пр. Перемоги, 54/1, м. Київ, Україна, 03057
E-mail: inna_dragon@ukr.net

УДК 378

DOI: 10.15587/2519-4984.2017.102930

METHODS OF DETERMINATION OF INITIAL LEVEL OF STUDENTS' KNOWLEDGES ON BASIC DISCIPLINES AT HIGHER MEDICAL EDUCATIONAL INSTITUTIONS

©G. Chovpan, I. Chovpan, L. Batyuk

Автори пропонують програму, яка визначає рівень вхідних знань студентів з англійською мовою навчання в медичних ВНЗ України. За допомогою вказаної програми оцінюється рівень залишкових знань з основних предметів, а також дає рекомендації для викладання у групі. Запропонований спосіб дозволяє викладачу вибудовувати більш успішний освітній процес, що покращує остаточні результати засвоєння курсу медичної та біологічної фізики

Ключові слова: медична освіта, система тестування, вхідний рівень знань, медичні ВНЗ

1. Introduction

The improving of quality of teaching English-speaking students is one of the priority issues among the teachers of Ukrainian medical schools. The number of students with English level of studying is increasing annually. It is connected with a long tradition of training foreign students in Ukrainian universities and with the global trend of increasing academic mobility and competitiveness and a high quality of education in our medical school. Obviously, the higher the quality of teaching, the greater the educational investment will be both in a particular medical school and the country as a whole. Therefore, it should be paid special attention to improve the quality of education from the point of view of methodology, didactics and psychology of studying. What are the problems faced by English-speaking students? From personal authors' teaching experience we can identify the following difficulties. It can be: acclimatization and adaptation, cultural and religious differences, low level of residual school knowledge in physics, mathematics, and other subjects [2]. It can be also low level of knowledge of the communication language in the region where the student studies. The last factor would allow it to adapt easily to domestic issues.

Some of these problems are adaptive and transient, but some can be improved with the help of our method.

It is obvious that one of the priority aspects for teachers should be increasing their socio-cultural level, the level of spoken and professional English language, and understanding of the ethnic composition of the group as a whole and consequently what you need to focus, starting the work with this particular group. One of the factors that can help the teacher, especially the young teacher, in working with English-speaking groups of students in the course of medical and biological physics, is a program developed by the authors of this paper, which defines the input level students in physics, mathematics, English, and also helps with the main recommendations to the teacher on the basis of testing. The advantage of the test method evaluation input student's knowledge is the ability to estimate all areas of the test item, a convenient way to quantitatively measure the level of knowledge and interpretation of the obtained results, as well as the same for all assessment system. The relevance of all these advantages is increasing in case of providing a valid, objective and qualitative test systems.

2. Literature review

The problem of improving the quality of medical education both for foreigners and for Ukrainians is widely

discussed at many scientific conferences and is disclosed in several articles. Papers [1–4] deal with the problems of adaptation and improving the education quality of foreign students. For example, paper [1] is devoted to the key problems and difficulties of adaptation English-speaking students in Belarus medical schools. While in article [2] author analyses the main difficulties encountered by teachers of medical biology, as well as proposed methods of input testing English level in order to improve the level of learning. The author also proposes some didactical methods for improving this learning process, e.g. revising textbooks etc. The author also points out the low level of residual school knowledge in biology. The specific difficulties foreigners of the first year of studying are analyzed in details in paper [3], while the socio-cultural characteristics of them are discussed in series of articles [4]. The articles [5–9] describe testing methods of estimation students' level of knowledge.

For example, article [5] has also proposed testing of students as method of evaluation of knowledge in chemistry and as a method for the current assessment. Also in this article authors are talking about College students and not foreign language. There is an analysis of the process of test evaluation without mentioning the education of foreign students in Article [6]. In article [7], the author analyzes the current testing as a method of assessment of medical students. While our method suggests it as an entrance test and for foreign students only, as the testing of local students is made at the stage of admission to the University. About reducing subjectivization when carrying out computer testing of students says the author of the article [9]. Also, the author of this work points out the shortcomings of conducting tests the test method. Standardization of educational process through the introduction of testing is of particular relevance with the introduction of the Bologna process, what he writes in his work, the author of the article [8]. The work also 8 provides the results of the pilot testing system for the students.

Thus, we analyzed the papers concerning the testing systems in working with the students, whereby it is possible to conclude that despite the importance of improving the quality of training of foreigners in medical schools, the problem of the introduction of testing it still has not been solved.

So, the proposed program is a testing system with user-friendly interface, accessible to any user, possesses basic computer skills. Testing of students might be performed during the first class in course of medical and biological physics; the program should take 2 academic hours. The test consists of four blocks: the introductory block, English language, mathematics, physics. As an example of questions for our tests we used [10].

3. Aim and research problems

Aim. The aim of this article is to propose the program, which must help teacher to improve learning process by determination the input level of knowledge of students in Ukraine medical schools with English as the language of studying. It assesses the level of residual knowledge in mathematics, physics and English and also gives recommendations for teaching in the group, taking into account the characteristics of specific educational

group. The program allows the teacher to build a more successful educational process, which in the end, improves the overall result.

Research problems:

1. To define technical conditions of working program.
2. To create the program according to the aim of research.
3. To write the didactical recommendations for the teachers after the test

4. Technical conditions, description of the program and didactical recommendations after the test

4.1. Technical conditions.

The program must have access to the Internet.

Tested and testing persons must have a personal computer with operating system Windows 98 and above or Linux OS with graphical interface and support the Wine program.

On Windows OS, the Internet access can be blocked by a firewall; to avoid it you must add the program to firewall exceptions. The program is written in Delphi Delphi XE8.

Scripts on the server are written in *PHP*. The result file of the group created with the help of languages *HTML* and *JavaScript*.

4.2. Description of the program.

The program has two modes, teachers and students. Let us describe of them.

The Student's Mode.

The program is divided into 5 blocks:

1. The process of filling data by the student.

In the main menu interface as follows: 4 text fields to enter first and last name, group number, department, name of the teacher of this group, as well as the Start button. In addition, there are three drop-down list to select the country from which came the student, year of graduation, level of English proficiency, according to the student's opinion (Fig. 1).

After entering all the data the program writes them to a text file.

Fig. 1. The screenshot of filling data process

2. Check the start of the test.

The program sends a POST request to a PHP script residing on the server. The script checks the existence of the file (its name is given) with the built-in PHP function called 'file_exists()'. If the file exists, the program returns the result 404, otherwise, it returns 200 (in accordance with the list of HTTP status codes).

The program then checks if the result came 200, then the file exists, then the test is started, else it is not started.

3. Reading issue with the server.

Reading a number of questions, then a temporary variable is filled in with the number of rows occupied by the question. Cyclically reads the question itself. This occurs "number of questions" time. In a loop from 1 to "number of questions" it is being read the answer to the question. All questions and answers are recorded in two special arrays, the first of which corresponds to the questions and the second one, respectively, to the answers.

4. The process of answering questions by the user.

The text box changes the text in the question text. By clicking on the "NEXT" button is checked, if the first option is (in Radio Button), the special variable recorded a value of 1, if second one is selected, variable record a value of 2 etc. Compare this variable with the array value with the index "number of question". If they are equal, then we add 1 to the corresponding count of the number of correct answers. "Question number" is increased by 1. Steps 1 – 3 are repeated "number of questions" time. The process of answering is shown in Fig. 2.

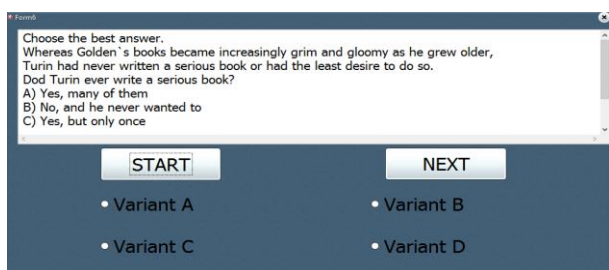


Fig. 2. The screenshot of answering process

5. Sending answers.

The program generates a text file with all test data and all counters. The program then sends query the text file using POST function.

6. Sending user replies to the server. After clicking "Next" for the last time the value of the test results is written in a text file, expressed as a percentage. Then this text file is sent to the server using POST request to a PHP script.

The Teacher's Mode.

In teacher's mode, the program is divided into the following units:

1. Data entry testing. The program has 3 text fields to enter the names of the teacher, a group number, and e-mail of the teacher.

2. Recording your own questions, if necessary.

Also there is a check box which selects tests by default.

If this check box is not selected, the instructor can write his own questions into a special form.

This procedure for making questions occurs according to the following algorithm.

Recording the number of questions for all subjects such as English, mathematics, physics. Set a counter *i*, initially equal to zero. Then you add question to the array with index *i* is added to the question itself. The counter *i*

is incremented by one. This happens *N* times – until *N* is the number of questions. After writing all of the questions, the program splits the array with questions on 3 subarrays for each subject. These subarrays are written in three text files. The text files are sent to the server.

3. Request to the server with the announcement of the start of the test. By pressing the Start button, the program generates a blank text file and sends it to the server.

4. Request to the server with the notification that the test is over.

5. Processing of test results takes place according to the following algorithm. Initially, the program sends a request to server to get a list of all the result files of the test. The program then selects the required files answers test. From the name of each file is known sending time in milliseconds. If the dispatch time is the time between pressing Start and Stop, it means necessarily processing this file. Processing of the file. File test response recorded: all the data listed by student number of correct answers for each subject separately.

Interpretation of result according to the formula:

$$R = \frac{n_{cor}}{n} \cdot 100 \% , \tag{1}$$

where *n_{cor}* – number of correct answers of the student, *n* – number of questions in concrete test.

We offer the following interpretation of the results for a tested person (see Table 1):

Table 1

Interpretation of the results of the tests	
Result, %	Interpretation
Higher than 80 %	High level
70–80 %	Enough Level
50–69 %	Satisfactory level
49 % and lower	Low level

The interpretation of group results has two steps:

Step 1. The average result of the group calculated using formula:

$$R_{group} = \frac{\sum_{i=1}^n R_i}{n} \cdot 100 \% , \tag{2}$$

where *R_i* are each students results, *n*-number of students in tested group.

Step 2. Creation a chart using JavaScript in accordance with the number of students who received a particular score. Note. By pressing buttons *Start* and *Stop* the program accesses the server to receive the server time in milliseconds. Identification of text files the start of the test, questions is name of the teacher and the group number. Identification file of the user's response occurs at the names of teachers and time in milliseconds.

6. Sending result by e-mail.

The result looks as follows (Fig. 3)

Group result table

Group	Surname	Faculty	Country	Year of graduating school	English level, by student's meaning	English result, %	Math result, %	Physics level, %
9-21	Some_Name_and_surname	Dentist	Andorra	2015	Beginner	25	33,3	36,4
9-21	Igor_Chovpan	Dentist	Andorra	2015	Beginner	25	66,7	72,7
	Average group level:					25	50	54,5

»

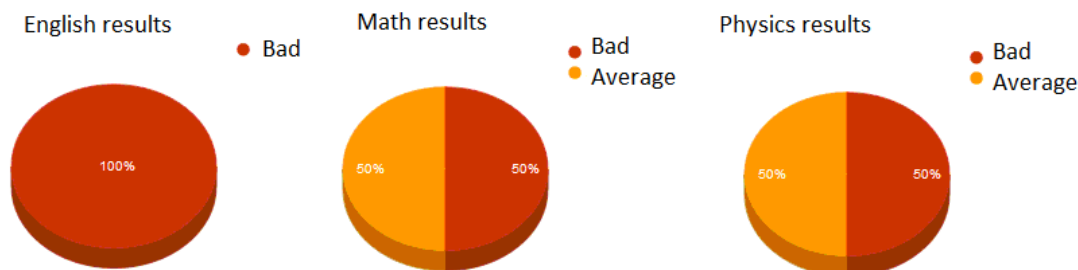


Fig. 3. The result of testing sent to teacher's e-mail

4. 3. The didactical recommendations after the test

- Orientation for motivated student(s) in each group. The recommendation for them is to focus on them more, to ask the most motivated student more questions.
- The orientation for the input level.
- Orientation to the language level of the teacher and the students.
- Orientation to a native country and its cultural and educational traditions.
- Appearance of the teacher, attitude significantly depends on student's native country.
- Checking the lecture notes. It provides additional disciplinary, educational impact, affects attention and behavior of the students during lectures.

5. Result of the research

The technical result is in increasing the objectivity and quality of evaluation of the effectiveness of the learning process, the decline of the dispersion of test results, which contributes to improving the quality of training. The invention makes recommendations for holding classes in this group, taking into account the special specific study group. The program allows the teacher to build a more successful educational process, which ultimately has a positive effect on the overall assimilation of the studied material. What does give the result of entrance input test concretely? It is clear, as we cannot change the composition of the group, but we may change teachers' process of preparation for classes. If a teacher sees that composition of group on the average is subzero, then he may additionally squander time on more detailed consideration of material, taking into account subzero entrance knowledge. As mastering goes on principle of the "built house", without ground floors it is impossible to build "next floors", the that additional strengthening of base knowledge resulted in the total in the greater amount of students that complete module works from the first time. The consequence is a less number of the missed classes and better result in medical physics in a group overall. Such result is a basic task of

our investigation, to increase maximally the amount of students, which do not have any debts. The same method we use if due to the ethnic composition of group the input level of English language is rather low. The teacher tries to explain the educational material by simplifying his speech. He tries to check up whether someone needs his additional explanations. Let us consider the situations of groups or persons with high input level. Under term «high input level», we will understand both groups with native speakers and high level in physics and math. The first option does not mean good level of knowledge but may simplify them the process of understanding the studying material. In this case, the teacher should pay attention to feedback during practical classes. Let us describe the last rather rare case when group in total or some persons have got high level of input test overall. Then the main aim for teacher is to keep this level and to have results as excellent as it is possible. Thus, the teacher may be ready to give additional problems, to suggest taking part in student's scientific conferences etc. Teachers even without input testing process can use all this methods, but even very experienced teacher needs some time and additional attention for estimating level of the group while in groups where our test was tried the teacher can understand immediately where the root of problem is. Therefore, our method improved the results of final test up to 15 %.

6. Conclusions

The paper presents a new method of determination student's input level of knowledge on basic subjects in medical schools, which is a testing system designed to assess residual knowledge of students in English in medical universities, in the framework of the English course, elementary mathematics, algebra and analysis and also the major sections of the school physics course.

1. Students and teacher must be provided with personal computers operating Windows 98 and higher or Linux OS with graphical interface and support the Wine program. Before the test the teacher must ensure that the program is allowed access to the Internet.

2. Questions (in English) are pre-installed in the testing program. A significant advantage of the program is the ability to add or reduce the number of questions in the test, in the case of, for example, lack of time, and ability to change the questions themselves. The teacher can manage the beginning and the end of the test. After test completion, the program analyzes the results and sends e-mail to the teacher. The results are presented in table form with a score for each subject and each student, expressed in a percentage, interpreted the group's result in each subject, as well as a pie chart the success of the group for each subject.

3. In addition, e-mails sent to the teacher contain psycho-pedagogical and cultural characteristics of each group of students, in accordance with the composition of the group, as well as recommendations such as orientation on the input level, high-level students, a native country and its educational tradition, with recommendations on the appearance of the teacher, and other educational achievements.

4. As a result our method can improve the results of final tests up to 15 % that we can estimate as a progress in teaching our subject.

References

1. Klyicheva, S. A. Adaptatsiya inostrannogo studenta k obucheniyu v universitete [Electronic resource] / S. A. Klyicheva. – 2013. – Available at: <http://conf.grsu.by/alternant>
2. Bragin, Sh. B. Iz opyita prepodavaniya meditsinskoj biologii na angliyskom yazyike [Electronic resource] / Sh. B. Bragin. – 2013. – Available at: http://repo.knmu.edu.ua/bitstream/123456789/735/1/689_online_konf.pdf
3. Katsapov, D. V. Rol kuratorskoj i psihologicheskoj pomoschi v adaptatsii angloyazyichnyh studentov k obucheniyu v VUZe [Electronic resource] / D. V. Katsapov, A. O. Syirovaya, L. G. Shapoval, E. R. Grabovetskaya. – 2013. – Available at: http://repo.knmu.edu.ua/bitstream/123456789/735/1/689_online_konf.pdf
4. Esli vash student-inostranets [Electronic resource]. – 2005. – Available at: <http://www.tstu.ru/book/elib/pdf/2005/popovain.pdf>
5. Zhbora, I. Testirovanie kak metod kontrolya znaniy studentov po himii v vuzah I-II urovney akkreditatsii [Testing as a method of control of knowledge of students in chemistry at universities of I-II levels of accreditation] [Text] / I. Zhbora, I. Stercho, S. Milevich // Molodoy uchenyy. – 2016. – Vol. 3. – P. 818–828.
6. Avanesov, V. S. Osnovy nauchnoy organizatsii pedagogicheskogo kontrolya v vysshey shkole [Fundamentals of scientific pedagogical control in higher school] [Text] / V. S. Avanesov. – Moscow: MISiS, 1989. – 176 p.
7. Seminskiy, I. Zh. Osobennosti ispolzovaniya testirovaniya dlya otsenki kachestva znaniy studentov v meditsinskom vuze. [The use of testing to assess the quality of knowledge of students in medical school] [Text] / I. Zh. Seminskiy, L. O. Gutsol, E. V. Guzovskaya // Sibirskiy meditsinskiy zhurnal. – 2010. – Vol. 98. – P. 42–44.
8. Movchan, N. I. Standartizatsiya obrazovatel'nogo protsessa posredstvom vnedreniya testovyih tehnologiy [Standardization of the educational process through the introduction of test technologies] [Text] / N. I. Movchan, R. F. Bakeeva, V. F. Sopin // Vestnik Kazanskogo tehnologicheskogo universiteta. – 2004. – Vol. 2. – P. 321–327.
9. Altshuler, O. G. Sravnenie sub'ektivnyh i ob'ektivnyh otsenok kompyuternogo testirovaniya [Comparison of subjective and objective assessments of computer-based testing] [Text] / O. G. Altshuler, O. M. Kolesnikov, T. Yu. Pavlova // Vestnik Kemerovskogo gosudarstvennogo universiteta. – 2012. – Vol. 1. – P. 192–197.
10. Testy po angliyskomu [Electronic resource]. – Available at: <http://testuz.ru/>

*Рекомендовано до публікації д-р пед. наук Синельник І. В.
Дата надходження рукопису 21.03.2017*

Chovpan Ganna, PhD, Associate Professor, Department of Medical and Biological Physics and Medical Informatics, Kharkiv National Medical University, associate professor, Nauky ave., 4, Kharkiv, Ukraine, 61022
E-mail: chovpan_s@ukr.net

Chovpan Ihor, Tobolskaya str, 46a, Kharkiv, Ukraine, 61072
E-mail: cigo1234r@gmail.com

Batyuk Liliya, PhD, Associate Professor, Department of Medical and Biological Physics and Medical Informatics, Kharkiv National Medical University, associate professor, Nauky ave., 4, Kharkiv, Ukraine, 61022
E-mail: liliya-batyuk@mail.ru