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USE OF IT FOR ADAPTING MIGRANTS

Kultan J., Kuprina, T.V.

Abstract

The article is devoted to actual problems of educational migration flows both in real and virtual environments. The article discusses the positive and negative experience with virtual platforms. Particular attention is paid to cultural and cognitive characteristics of the students belonging to the Generation Z, which requires the creation of entirely different instruments for implementing the educational process. The authors propose the method of creation, management and evaluation of feedback in the process of virtual educational migration using the latest IT- technologies that are used to create ultra-fast feedback and allow bringing new technologies into the learning process.

These results confirm the possibility of the new method of providing feedback, allowing to improve the training quality of students, who are members of the educational migration flows. However, the use of IT- technologies is not a sufficient factor in improving

the quality of education and the level of progress achieved by the trainees, but it can be a good helper in the course of examination, automation of selected methods of control, more individualized approach to learning.

Key words:

education, educational migration, modeling, virtual technologies, feedback, economic feasibility, incentive effect, Generation Z, cultural and cognitive characteristics, highly skilled migration

Introduction

In today's globalized world international migration flows are becoming increasingly important being a complex and multidimensional phenomenon. They have many characteristics and different directions, one of which is educational migration related to the internationalization of education and the demand for highly qualified personnel. In fact, educational migration is a global intellectual capital both for a distinct society and countries' associations as a whole.

Such interest and competition among the developed countries are due to shortages of highly skilled labor resources. According to experts, at the beginning of the XXI century the lack of specialists in such fields, as IT-technologies, was as follows: in the United States - 850 thousand people, in Europe - 2 million people. The high demand persists in such industries as aerospace, aviation technology, health, education. It is noted that the problem can not be solved only through the expansion of domestic resources implementing new educational trends and retraining. Thus, due to the expansion of educational migration flows one can get a number of benefits from the dissemination of knowledge and satisfaction the demand for highly qualified specialists in the most advanced and fastest growing sectors of the economy.

Effective educational migration can be one of the mechanisms to solve existing problems, as its economic, political and social benefits are quite obvious. As a result, exports of education allows a country:

- sell educational services on the international market;
- cut costs on primary and secondary education of future foreign entrants;
- use financial investments of foreign students for the learning process in the interests of local businesses, services and local budgets;
- improve the gender and age structure of the population by attracting young people of reproductive age;
- obtain new citizens, entering the Russian society by the most profitable way – through the educational system, taking into account that in the course of their studies, they are integrated into the receiving society [1].

In general, educational migrants are a quite promising object for research. They have a high communicative resource and are more attractive to the host community than other migrants because they can have a positive impact on the development of the region or country. Consequently, the economic, social and political benefits of educational migration can and should be the basis for making the development of educational migration an important part of migration policy [3].

Success in the field of educational migration depends on concerted decisions and actions not only at the level of university management, but also at the level of regional and federal immigration policy. As a result, in the current socio-demographic situation,

international education migration can be regarded as a significant resource of required highly skilled migration in general. At the same time, it should take into account the peculiarities of today's younger generation, which is significantly different from previous generations. They are often called Generation Z (Digital Native) who was born between the early 1990s and the middle 2000s. The common features of Generation Z is the fact that they are "connected" to each other due to such things as the Internet, YouTube, mobile phones, SMS, MP3- players, handheld devices such as PSP.

Researches have shown that the training pays off precisely when using the most suitable for a person ways of presentation. So, D. Kolb concluded that people often study by using one of the following learning methods: 1. Specific practice: real experience enables a person to understand and feel what he/she has to do. 2. Reflection: involves the analysis of their own and others' experiences. 3. Designing a model: the creation of a theory that gives meaning to the observed phenomena. 4. Method of trials and errors: people tend to try different options, actively experimenting with new approaches [4].

In fact, taking into account the specificity of the cultural-cognitive profile of students and, as a consequence, the nature of their educational activity will meet the expectations of students and make the learning process more effective. [5]

Thus, firstly, educational migration is a source of highly skilled labor forces and improving the quality of human capital. Secondly, there is a need of changing the approaches to teaching, as traditional "passive" approaches, based solely on memorizing and reproducing the material under study, can no longer fully meet the psychological type of students. In life of Generation Z there are many virtual gaming moments. Consequently, it is more and more necessary to introduce interactive technologies into the teaching process.

I. Educational migration: real vs. virtual

At present, the competition of countries - exporters of education is entering a new round, there are new players and in the coming decade it is quite likely an educational division of the world. By 2025, the total number of students in the world will increase from 97 to 260 million people. According to the forecast of UNESCO, at that time there will be 5-7 million foreign students. Two-thirds of them will come from Asia. India and China will be leaders in the supply of students; therefore, the fight will precisely unfold for these regions [6].

UNESCO defines the category of foreign students (education migrants) as the persons admitted to undergo a specific program of study at institutions of higher education in the country where they do not have citizenship. This migration is classified as temporary, limited by the time required to pass the course. These migrants usually receive special student (not immigrant) visas, which often provide the right of entry with the accompanying family members, and limited employment opportunities [6].

In training of their citizens abroad there are interested both donors and host countries, which often assume part organizing training costs. On a personal level, in getting education abroad are greatly interested students and graduate students, as evidenced by the increase in their numbers, even when training at their own expense.

Experts predict that competition for international students as the most desirable category of migration will escalate. Overall, the world market of educational services is estimated at 50-60 billion dollars. Particularly active in attracting students are economically developed countries (United Kingdom, Germany, USA, France, Switzerland, and others.). In particular, the US State Department over the years has allocated substantial funds for the implementation of programs on development of student exchanges and attraction of foreign students and lecturers for study and internships in the United States.

Moreover, small countries without diversifying education systems often have a higher mobility of students and graduate students who after graduation plan to stay and work in leading foreign research centers.

In order to attract foreign specialists, the return incentive and motivation going abroad compatriots, countries use a variety of complex measures [6]:

1. Implementation of special programs to encourage the inflow of certain professionals categories.

2. Simplification of the procedure and conditions of employment for highly qualified specialists.

3. Provision of international students with the opportunity to work on their territory during the training and continue working afterwards.

4. Creation of a special infrastructure. Taking into account the wide spread of English, foreign language countries provide courses in English. Considerable resources are invested in social and living conditions – the libraries, equipment campuses, transportation infrastructure.

5. Conclusion of agreements between countries and universities, the establishment of foreign branches contributes to the export of educational services. For example, American universities are opening their branches in Europe and Asia, which thus gain access to the American education in their own countries. In turn, American universities are expanding the number of students of whom they will be able to select the best candidates for further training and even work in the United States. Russian higher schools also have such experiences (branches of Moscow State University, Peoples' Friendship University, et al. in the CIS countries).

6. Stimulation of the training and subsequent return to the homeland is done in order to protect the interests of donor countries. For example, China conduct a support of training abroad, encourage return, freedom of entry and exit, which corresponds to the policy of openness and international cooperation of China with other countries in the field of education.

7. Implementation of policies to facilitate the return of highly skilled migrants and the interest of foreign specialists to continue working abroad. For example, there is a developing infrastructure for the innovative business sector of research and development activities, provided financial support.

In general, at the moment, despite the tightening of the rules of entry and stay on the territory of foreign states, migration policy in many countries are increasingly focused on attracting highly skilled professionals, graduate students, providing them with a number of privileges and preferences.

Absolutely new direction of training and attracting foreign specialists and students are massive open online courses (MOOC). In this regard, one can speak of a so-called virtual educational migration. Education not only changes the distribution channel, but also the high-quality format by digital channels of learning, such as gamification, simulators, virtual reality 3D. Virtual education is also considered as one of the variants of the selection of talented students for future job offers [19].

Virtual technologies allow creating flexible individual training scenarios tailored to the rate of assimilation of each student. Moreover, with the help of web cameras one can monitor non-verbal communication, and using smart phone or "smart" watch - even a change in the physical state of a student. It allows keeping a track of the time losing focus, adapting and optimizing the flow of information [7].

At the same time, experts have warned of a possible change of control over education to several leading universities, mainly Anglo-Saxon, which are able to select the best specialists around the world. MOOC is electronic learning courses, including video lectures with subtitles, presentations, infographics, textual lecture notes, homework, virtual labs, tests and final examinations. Unlike traditional lectures video materials are presented in 5-10

minutes fragments (corresponding to clip material perception by new generation). While training there are actively used forums for communication between students and lecturers. MOOCs are created by most of the leading universities in the world.

Thus, the world's leading universities aggressively use new technologies to increase their share of the education market. Any universities could include in their programs courses of the best lecturers in the world. In addition, the development of methods for analyzing large data turns MOOC into a unique research platform. However, there are several problems with the use of MOOC platforms. For example, it is impossible teach virtually all specialties (e.g., the field of medicine). Due to the lack of real communication there is a loss of socialization in training. "Although perhaps for the generation of gadgets online communication skills and training will be an important part of the socialization at the growing popularity of virtual communication and remote work" [8].

Another problem is a small percentage of students who receive certificates. "For many students MOOC is not a tool for vocational education but the kind of intellectual entertainment for the expanding horizons" [8].

Besides offered educational courses for MOOC platforms, there are problems of expanding of the geographical influence and language localization. For example, Coursera has launched a project for translating their courses into other languages. Its Russian partner has become the company ABBYY Language Services, to provide a platform for the translation.

At the same time MOOC platforms are tools for cultural influence. Thus, two-thirds of Coursera students are foreigners, including Russians, who actively explore the language, culture and values of other countries and peoples.

"The theme of the struggle for cultural influence is particularly relevant for Russia, since the liberalization of education with its transition to the online sharply complicate the transition of traditional values. Moreover, MOOC fight not only for the souls and values, but also brains. It is an effective tool for the "drain" of the most successful students into the world's leading universities "[8].

Open education gives students the chance to choose individual learning paths. In addition, the platform there are used modern technologies to develop the necessary professional competences in the form of simulators, games and the like, which are more understandable and familiar to today's younger generation. There mat be a blended learning (bothvirtual and real). ... In the future, the platform will receive additional directory of online projects for team working from the representatives of business, there will be developed mobile applications, improved teaching methods, the ability to study master degree [9].

Consequently, it is possible to determine the advantages and some problems (in the particular context they may transfer into advantages) of online learning. They include: free subject choice and schedule of their study, interactive teaching methods, adequate to cognitive abilities of today's students, the lower cost of educational services vs. lack of the personal contact with the lecturer (but it may be considered as a new kind of socialization in a virtual environment), quality equipment and Internet connection. Thus, in the modern education system there are clearly visible new trends that require new approaches and methods to preserve the competitiveness of both universities and teaching staff.

Therefore, one can speak about a cross-border higher education and internationalization of universities, i.e. education received when lecturers, students, programs, universities cross national borders. Universities are integrated, i.e. developing dynamically in order to adapt to a rapidly and continuously changing environment [10].

In addition, universities need to take into account the cultural characteristics of foreign students, whose number according to experts tends to increase.

Besides, there is a possible entry of foreign providers of education services to local markets. As for the real learning environment, Russia's approach to the commitments on

modes of supply of educational services in many ways similar to the approach taken in the United States and the European Union. On the one hand, it is characterized by removing restrictions on market access for cross-border supply and consumption abroad. On the other hand, it includes restrictions on the conditions for foreign suppliers of these services. Such an approach will neutralize concerns about the full opening of the educational sector to foreign investors.

Thus, the preventive measure is the introduction of control over the provision of educational services by foreign partners. However, for example, in connection with the opening of a branch of the University of California in Yerevan (Armenia), a large outflow of students from national universities is not observed.

On the other hand, cross-border education is often in a virtual (remote) format, which cannot influence on the content and quality of getting knowledge. Foreign lecturers are generally quite independent in carrying out the methods and content of ongoing training. Accordingly, there must be a high level of qualification requirements for foreign lecturers.

Thus, in the existing context one can talk about an innovative information and learning environment (ILE) as a system-organized set of information, technical, educational software, inextricably linked with an individual as the subject of the educational process. ILE accumulates all national cultures and on the whole it can be seen as macro environment, and in a particular way – as an immediate social environment, i.e. the microenvironment [5].

Therefore, expanding educational migration, both real and virtual, and also cognitive features of Generation Z, preferring the virtual and creative forms of work, requires designing of new educational trajectories. Particularly noteworthy are such learning technologies, in which students take an active part in the proposed activities.

II. Computer simulation of educational migration cases

One of the main components of the active adaptation model of educational migration is the formation of the educational system and its forms and, in particular, forms of post-graduate education (life-long learning). An important role in this model plays the feedback in the education process and its assessment. It is important not only from the educational point of view of the final result, but also in relation to the correction of the educational content and forms. One can assume that educational migrants have originally owned the basic skills to work with information and communication means, in particular, the modern technology of mobile telephony [12]. Therefore, it is natural and appropriate in the process of transmitting information and knowledge to use e-support and e-learning, which has a number of advantages [13]:

- relatively easy way to obtain training materials;
- flexibility in curriculum development, quick and easy update of educational training courses;
- effectiveness of communication between lecturers and students;
- geographically unlimited training, individual approach and progress in students training;
- electronic register of actions and measures in the assessment of students' knowledge;
- remote access to the lecturer;
- long-term reduction in direct and indirect costs for the organization and management of education;
- implementation of training in concrete and specific conditions in production and non-production companies.

The main disadvantages in this process are:

● labor-intensive processes of training courses preparation;
● limited practical skills;
● limited direct interaction between lecturers and students;
● access to computers connected to the Internet with the necessary data rates.

Additional features typically include:

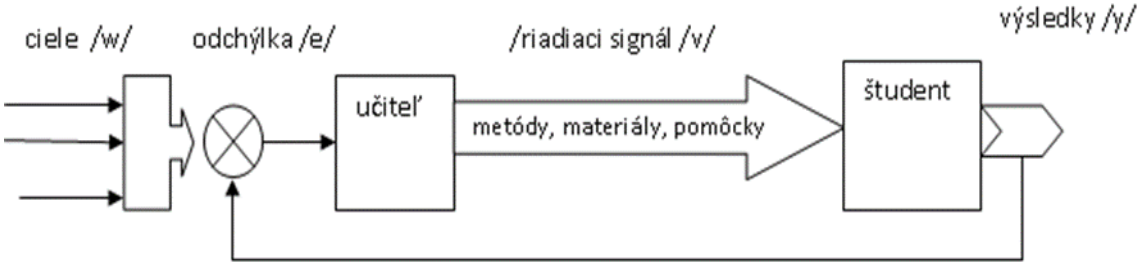
● Self-study, in which one can use multimedia programs with educational topics stored on CD-ROM or DVD- ROM. The method base is students' exposing of the specific training schedule, and an agreed plan of studies, because training is carried out without the contact with the lecturer. The biggest advantage of this method is its flexibility. The disadvantage is the risk of non-transparency in the form of educational materials processing by students.

● Online courses via the Internet and Intranet also have a form of self-study by the university and other educational portals with a minimum requirement for the registration of the user. There can be used the methods of direct access with direct attachment of an educational portal on the Internet. One can work by the off-line method, in which students download materials from the educational website and save it in their computer. However, this kind of training need students' high motivation and strong will.

● Training with the lecturer-leader is carried out on-line, synchronously and in real time. The most suitable form is the use of videoconferencing systems, a modern information tool, that is used for video and audio connection for two or more participants, allowing to share data presented [14].

Thus, on-line education has certain advantages, but the main problem is the establishment of feedback and assessment activities on the basis of IT-technologies.

The learning process (Fig.1), objectives and ways to achieve them can be compared with certain simplifications of a technical control system. One of the main tasks of management processes is to create a proper feedback which can not only maintain the controlled system in the sustainable state but also to achieve the desired result. In the technical sphere there are developed different approaches to creating effective feedback for linear and nonlinear systems.



ciele /w/ - objectives /w/, odchýlka /e/- deviation /e/, riaciaci signál /v/ - control signal /v/, výsledky /y/ - results /y/, učiteľ - teacher, metódy - methods, materiály - materials, pomôcky - equipment, študent - student

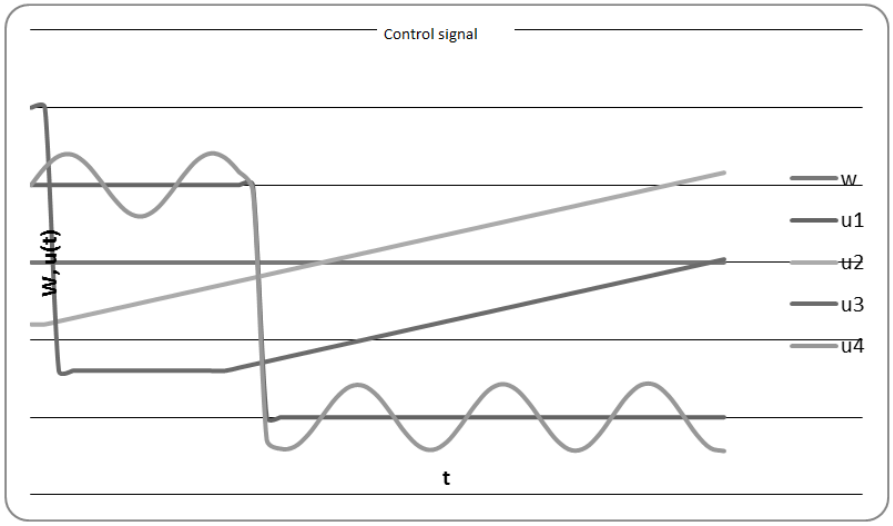
Fig. 1. Learning process in schools

The learning process is aimed at achieving certain objectives to be achieved within the given timeframe. Consequently, the learning process can be viewed as a system that has many features in common with technical systems.

The purpose of the section is to disclose the concept of feedback in the learning process and its implementation with the use of modern information and communication technologies.

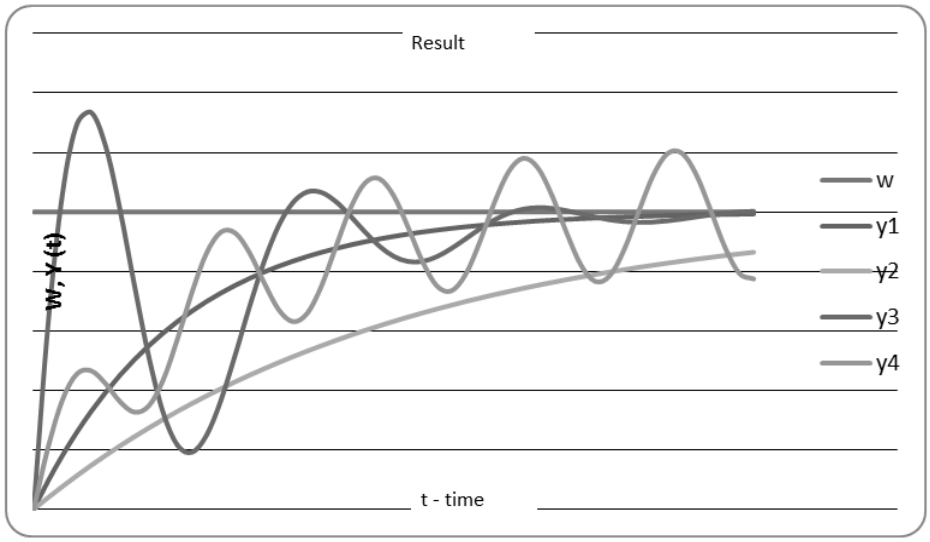
In the process of management of a machine or a person one must not only set a goal of this activity, but also to check the achievement of this goal. In case of deviations from the intended goal, one needs to change the input value to the controlled system.

In practice, there may be a few cases of the process development: the system detects a deviation, and outputs a one-time impact of moderate intensity; the system provides a short impact and a few small ones, which are summed up; the system strongly reacts to the deviation, and then gives a moderate impact and several integrating small impacts (Figure 2).



w - learning objectives, u1, ..u4 - control signals

Fig.2. Change of control signal



w - learning objectives, y1, ..y4 - output signals

Fig. 3. System reaction to impact signal

Depending on the system, strength, impact duration and deviation magnitude there can be achieved several results. The most significant result is a noticeable gradual tightening of the system to the desired result. The less acceptable result is the goal anievement with minor fluctuations. Typically, these variations require more energy input and / or may result in a violation of the system stability. If the impact is not enough tightening may continue for a long time and does not bring a positive result. The most unacceptable result is too much excitation of the system and the violation of its sustainability (Figure 3).

The main task of the management theory is the selection of the successful impact on the system. In technology, there are many methods of selecting the correct impact to preserve sustainability and achieve the objectives. It often happens that we reach only the first part - the sustainability and only then try to change a little the objective and achieve the modified one.

Learning management system is shown in Figure 4, where U - the lecturer; S - student; w - the object of learning; y - learning outcomes; e - deviation; v1 - the environmental impact on the lecturer; v2 – the environmental impact on the student; u1 - student's activity management.

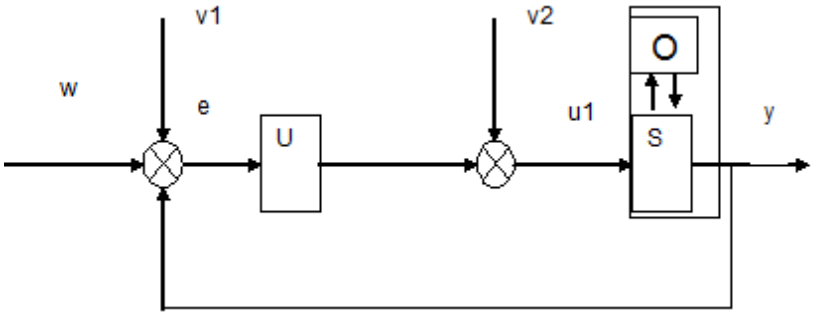


Fig. 4. Learning Management System

In comparison it is clear that the technical and educational systems are similar. The problem is only in determining the correct approach to learning. In the process of learning as a measurement of the knowledge level one can monitor both the students' reaction in the classroom and select one of the motivations, i.e. a test in order to stimulate and determine the level of their knowledge. One can spend a complex test and / or intermittently apply the whole range of test instruments and incentives [15].

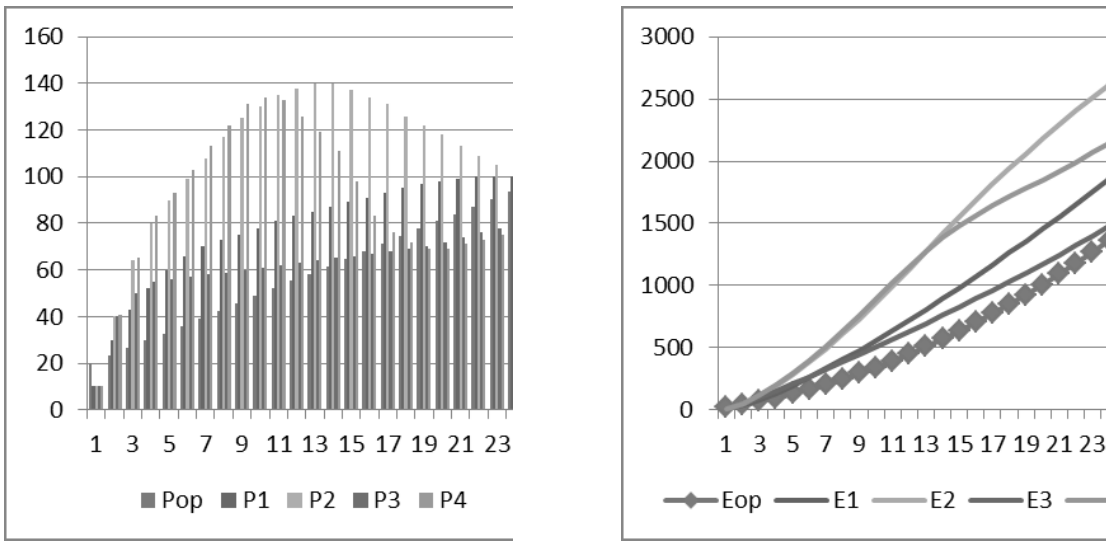


Fig. 5. Changes in expended energy E comparing to parameter P

Thus it is necessary to consider, as in the technical system, the magnitude, direction and frequency of selected stimuli. The wrong selection of these elements may have negative consequences. Too many tasks, assignments, tests, presentations, various consultations can lead to students' fatigue, sometimes even lecturers, and the disintegration of the system.

Therefore, every human activity is to be implemented with optimal labor costs. If the plane under the curve is considered as an equivalent to students' work, it is necessary to motivate them so that the costs will be minimal (Fig. 5).

So, do not set a lot of tasks, but give such assignments (Fig. 6), tests using modern tools (chat, forums, presentations, formative testing by computer systems, etc.), when the area under the curve is minimal, but students reach the desired result.

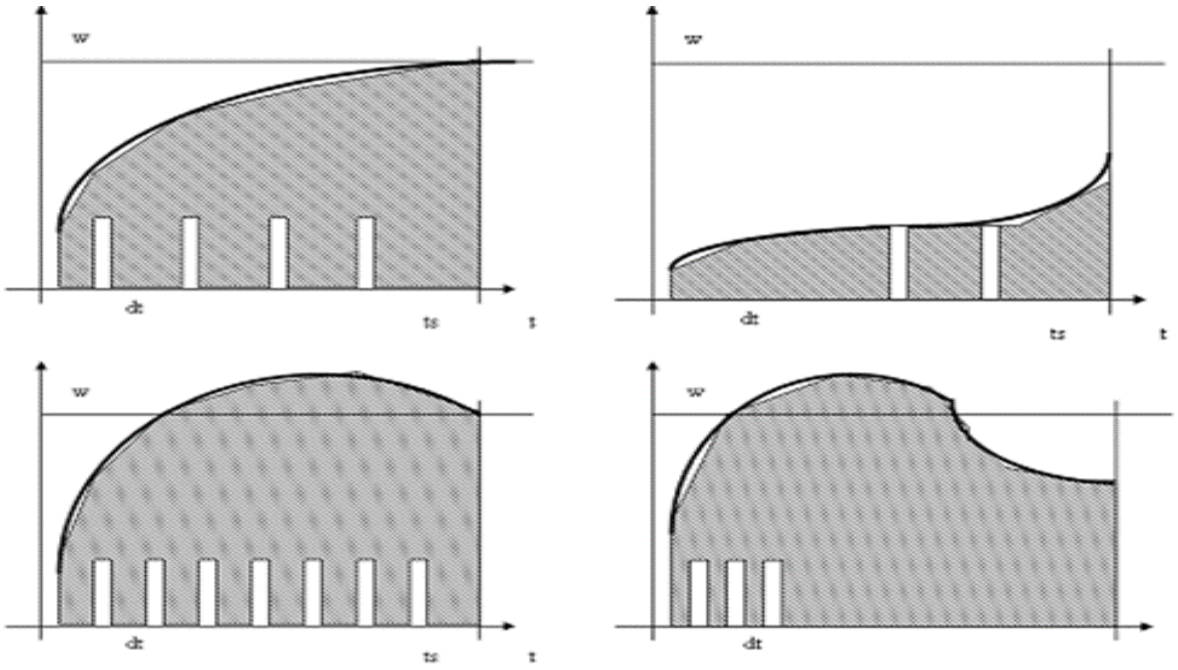


Fig 6. Selecting the number of control parameters

To determine the number and range of separate elements it is necessary to determine the improvement in students' results depending on the use of a stimulating element. For the calculation of the impact of the given element on the final result one can apply the following equation:

$$P_i = \sum_{j}^{n} p_{i,j} \text{ , or } \quad P_i = \mathrm{mod}\left(p_{i,j}\right),$$

i – element coefficient
j – student
n – number of students
P – element - impact test parameter to change the result of learning

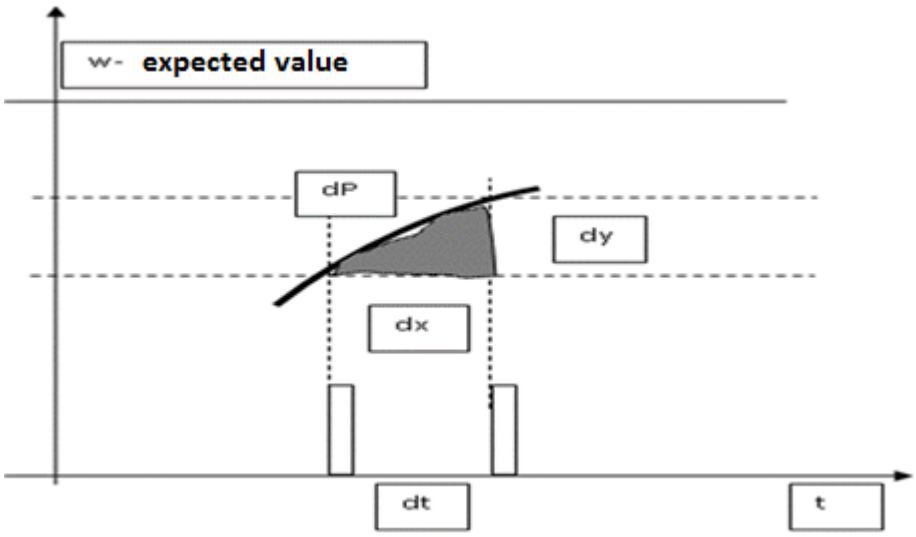


Fig. 7 Increase knowledge of the control element

After selecting the values of P (Fig.7) one can select so many stimulating elements and in such an amount to achieve the set objectives cost-effectively.

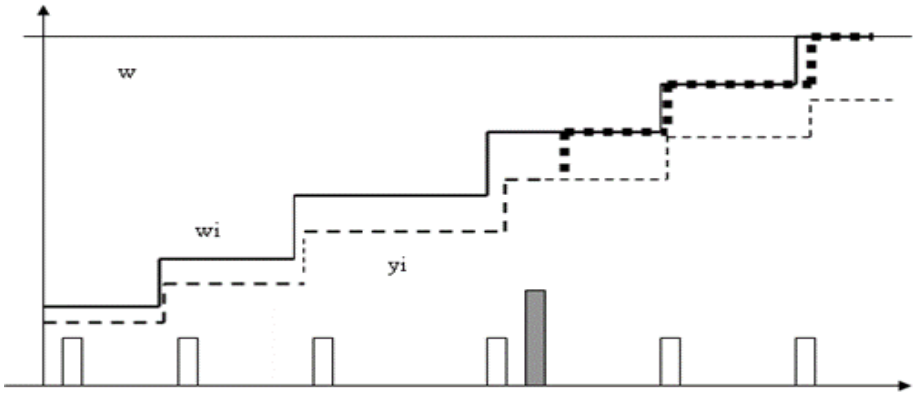
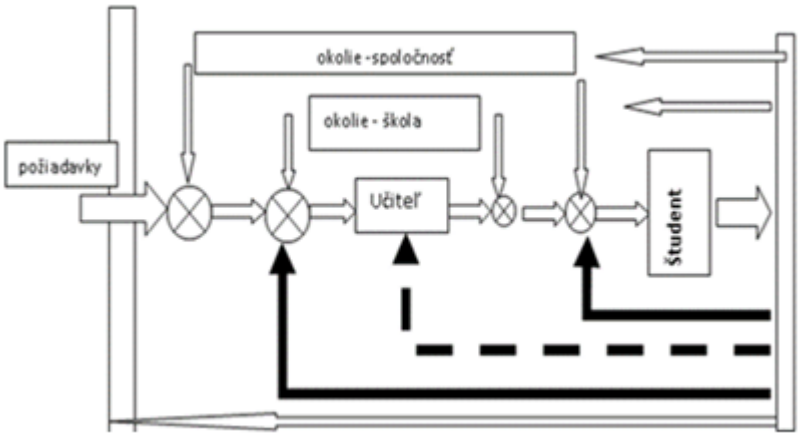


Fig.8 Creating a set of drivers

Currently, to achieve very fast and efficiently the desired result, it is necessary to break the process into several smaller processes. Then to add a stimulus (Fig.8). In the case of partial failure of achieving objectives, it is necessary to add another stimulus.Application of some ideas of control engineering systems theory can reduce the time to prove that work. For example, the position of the plane minimum under the control curve has already been proved, so lecturers only need to determine the increment used for each element of feedback.

As for solving the problem there must be more research, then for the implementation it is necessary to unite lecturers from many countries using modern technologies that can be GRID and CLOUD technologies, where are test systems, working forums, students chats, discussed the results of experiments , educational materials, etc.

Use of IT-technologies in teaching not only facilitates the work of lecturers, but also has an impact on the learning process. The ability to quickly find the necessary information, the possibility of rapid communication between the participants of the educational process can lead to a change in the learning process. The ability to implement multiple types of feedback (Fig.9) can also lead to changes in the learning process and delivering lectures.



požiadavky – requirements, okolie – spoločnosť – surroundings – society, okolie – škola – surroundings – school, učiteľ – teacher, študent - student

Fig. 9 Many Layered feedback

It is a new methodology with using IT-technologies to explain the new educational material, promoting the audience's motivation, which is especially important with increasing enthusiasm of young people with new technologies and their capabilities, without which they cannot imagine their existence. With the help of these technologies, they are communicating with their friends, use them for payments, listening to music, provide information about where they are, create their own nets of friends, etc.

The role of feedback is to provide information on the knowledge level and understanding of new material directly in the learning process. At the moment, lecturers have the opportunity to change the ways and methods of their work; can explain in more detail incomprehensible or not to spend time on something that is already known to everybody. The resulting additional time is used for the transfer of knowledge from other areas of science.

Since the implementation of feedback by classical methods is not rapid enough, we can use the technologies with which students prefer to work. For this purpose, a small application to mobile phones is designed, and the lecturer can make a presentation directly into a number of issues. Students vote and on the basis of their replies the lecturer receives full information about students' knowledge. The great advantage of this system is the feedback when the lecturer receives a response from all students and each student votes on their own, independently of the others.

Investigation of the impact of the introduction of continuous feedback with the application of Learning Management System (LMS) Moodle has been realized in the University of Economics in Bratislava (Slovakia) (Fig.10). The results of this research confirm the possibilities of the new method of supporting feedback improving the quality of students' training [17].

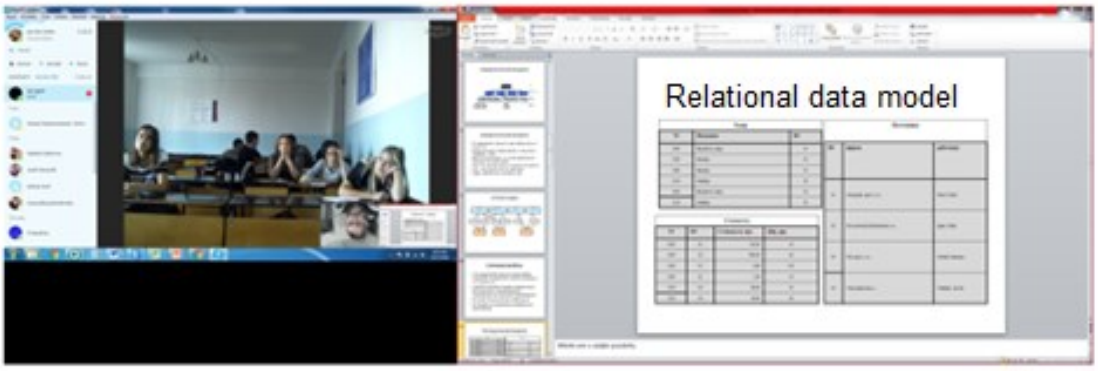


Fig.10 Use LMS in education virtual migrants

All students could be seen and heard, the requests could be checked in a chat, and the results of these requests on the server database system. If necessary, one could use the program Teamviewer to view the contents of a student computer screen. All the tasks the students solved on the server Oracle, which was installed on the server kultan.euba.sk:8080/apex or on the server MySQL installed on site hostinger.ru. Electronic verification and registration of the student's work made it impossible just to sit in the classroom but demanded high activities.

Based on the results achieved by students during the semester, one can add or remove tasks. The exam takes place in a fully on- -line mode and contains both a theoretical part and practical. Since students are not in the same room, the exam tasks should be formulated in such a way that they can not be solved by CtrlC CtrlV. The practical part of the exam takes place in the mode of direct connection to the server of the selected system (Fig.11). Students can choose the server on which they work better. The lecturer has the ability to check the performance of each student by means of the direct access to the desktop. The entire exam takes place under the supervision of the video camera, and the students already know that the exam is recorded. So, if in the classical exam the lecturer can distract or look the other part of the audience, the camera will not.

E-courses and methods of their implementation can be used in international cooperation with the active involvement of lecturers from different countries. Thus, one can manage joint training courses to improve the general level of education and reduce costs [18].

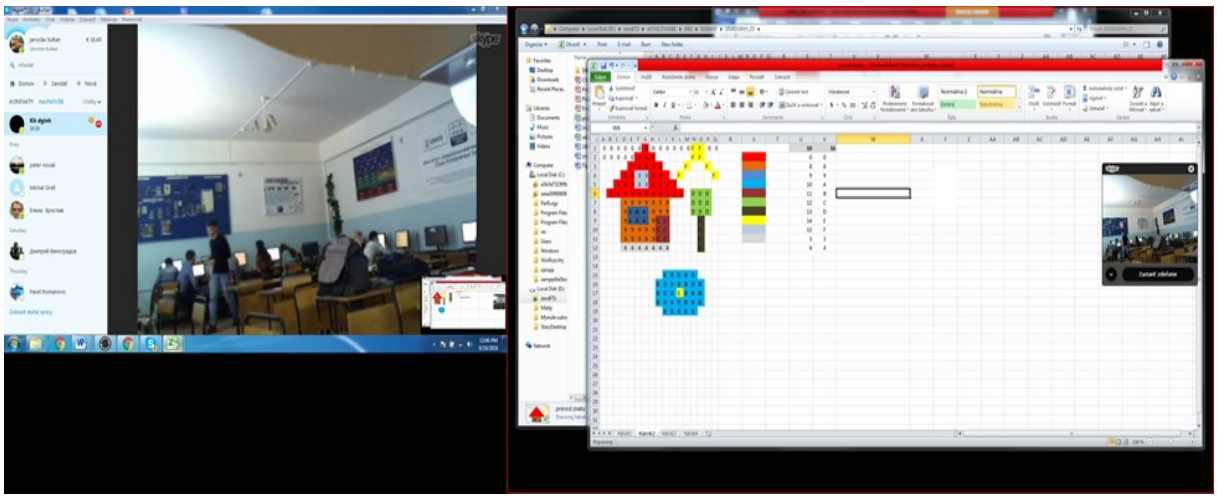


Fig. 11 Preparation for the practical examination with the use of virtual space

Based on these results, it has been decided to reduce the presence of foreign professors in the university in real mode, as it is enough presence of a lecturer for two weeks at the beginning of the academic year. During this time the lecturer delivers introductory lectures and holds introductory practical assignments. At the same time, there are created all the passwords for the access to the system taking into account the time shift between the two countries.

Conclusion

After analyzing theoretical and practical provisions relating to educational migration flows, we have come to following conclusions:

1. Effective educational migration can be one of the drivers for the resolution of a number of socio-economic challenges: the acquisition of highly qualified specialists in reducing the cost for their training, the use of foreign students' financial investments in the interest of local budgets, the sale of educational services at the international level.

2. Attracting foreign students creates a special kind of competition. To expand the influence and selection of the most promising candidates for highly skilled migration leading universities around the world have widely used virtual learning platforms, i.e. one can talk about a virtual educational migration.

3. Emergence of new forms of learning both the real and virtual requires new approaches in creating training programs, taking into account the peculiarities of cultural and cognitive profile of Generation Z in order to meet the expectations of students. Invalidly chosen method of presentation makes the learning process tiresome and creates a feeling of something alien.

4. There are a number of problems when using virtual platforms. Virtually, one cannot teach all specialties, there is a loss of socializing function of real learning, geographically expanding the influence of other cultures and language localization.

5. A properly designed open (virtual) education has a chance to select an individual learning path, use of IT-technologies and blended learning (virtual and real).

6. One of the important issues is to support the feedback (lecturer-student-lecturer), definition of its model and the possible ways of its implementation. Modeling of the processes of feedback is possible by the analogy with the modeling of the technical system control.

7. The main objective of the feedback control is the selection of the most successful impact on the system. The wrong selection of stimuli may have negative consequences. Therefore, the implementation of activities should take place with the best labor costs associated with the use of IT-technologies, with which the Generation Z prefers to work.

8. Use of these systems may be one of the tools for teaching migrants at virtual adaptation courses when they prepare to move to another country. Thus, they can show their professional competences that promotes faster decision whether to grant a residence permit and training.

9. With the creation of modern virtual educational platforms and programs economically feasible to limit the real presence of foreign lecturers at the host university to a certain minimum, followed by the virtual feedback support.

Thus, the education system is entering a new paradigm of real and virtual education, due to the interaction of international actors in this process, that requires the development of new educational courses and programs taking into account the cultural and cognitive features of Generation Z.

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