

The Use of Interactive Methods in Teaching the Russian in Technical Universities of Kazakhstan

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Abstract: The article aims to consider business simulation games and empirical training abroad as a part of continuing education system with a focus on their practical significance and value for socialization for water management students. Programs of Moscow Timiryazev Agricultural Academy and foreign real and virtual simulation games scenarios were used as materials. The comparative method and the methods of modeling and visualization were applied. The examples of business simulation game implementations in the field of water management, including Aqua Republica, International Drought Tournament, Shariva and Ravilla, were studied and the main advantages of such games were pointed out. The two options of seasonal practice in Europe planned by the Russian State Agrarian University — Moscow Timiryazev Agricultural Academy and the experimental Canadian-Cuban program of training abroad were analyzed in detail as an example of the effective practical learning. After the comparison of Russian and foreign practices the formula of any new method in today's higher education has been provided and the most effective blended learning methods have been pointed out. The results of the study can be used in the development of curricula and courses of agrarian higher educational establishments in Russia and abroad.

Keywords: Higher education, Continuing education system, Practice-oriented training, Business simulation game, Empirical training abroad

1. Introduction

The changing world entails a response in the programs of higher education, in particular, development and implementation of new relevant teaching methods for training of qualified professionals, including in the area of effective agricultural and water management. And it has be note, we can observe two inverted actions in modern education. The decreasing appeal of a pedagogical profession in the society and the other hand - increasing requirements toward graduates' professional competence. The last is connect with reforms related to European standardization, informatization, computerization of society and globalization, a number of problems are observed in the majority of agricultural universities of Russia, including a low budget, insufficient and/or outdated equipment, insufficient educational space, shortage of qualified teachers proficient not only in theory but also in practice, etc. Similar problems have been identified in other countries (Nooghabi et al., 2011; Ivanova et al., 2017). Furthermore, a weak connection between science and industry, lack of interest on the part of students in receiving quality education, formalism on the part of teaching staff are often pointed out. And one more nowadays problem is the ignoring of the advantages and the potential of the persons with disabilities (Miethlich and Oldenburg, 2019). The simulation games reflect the situations, events and processes which happen in reality and therefore can form the experience of making the decisions in complex environments, such as in the water and agricultural management. Moreover, the interdependency of the students taking part in such game will demonstrate how the decisions made influence the other players (Rusca et al. 2012). Nowadays, a dynamic upgrade of methods in higher education requires a qualitative functional and strategic revision.

The article overviews the practices implemented at foreign higher educational establishments and at the Russian State Agrarian University — Moscow Timiryazev Agricultural Academy that include new teaching methods (business simulation games, empirical training abroad). Their relevance is substantiated, advantages and problems of implementation are pointed out, and respective conclusions are drawn. The material is illustrated by flowcharts.

Study hypothesis is based on the definition of teaching methods concept proposed by Sadovskaya, according to which teaching methods are the constructive unity of ways and means of effective transfer of a certain part of social experience to the students, which ensures successful self-realization of students in learning (Sadovskaya, 2007). In this way, the teaching method is initially oriented at autonomous thinking and constitutes, in essence, a construction set consisting of pieces – techniques. These pieces can be changed (added, interchanged, transformed, etc.) to create a new relevant method according to the desired goals.

2. Literature Review

The new methods are inextricably linked with technical innovation and the use of new information technologies. And it gets super actuality in a condition of modern pandemic and lockdown. This requires a new form of learning like a Moodle environment for example. (Ukhov et al., 2020). The works on synchronous and blended synchronous learning are of great interest for studying new methods in higher education (Bower et al., 2015; Kaur, 2015).

Another innovative group of studies is devoted to the possibility to promote educational services via social networks (Dabbagh and Kitsantas, 2012; Vinokurov et al., 2014), which have become an integral component of a modern student's life. The mobile technologies give numerous opportunities for the innovations in the educational process. The combination of the modern devices and teaching methods not only help students to learn the subject per se but also gives them the opportunity to develop valuable skills by encouraging communication, problem-solving and creativity (Warschauer, 2007; Klopfer, 2012; Sung et al., 2016). It also helps the teacher to create positive psychological climate at the classroom and to optimize the learning process due to individualization of education (Trotciuk, 2020).

Active and interactive methods come to the fore in the analysis of perspectives of higher education and describing pedagogical innovations, and the priority is given to the practice-oriented learning (Kruglikov, 2018; Leal-Rodríguez and Albort-Morant, 2019).

It is noted that in accordance with the present-day reality learning should be based on the demands, experiments, research, modeling and critical thinking, while the latest technical developments enable us to maintain these processes in electronic learning environment (Pedaste et al., 2015). Additionally, globalization makes necessary the internationalization of higher education (Guri-Rosenblit, 2015; Kobza et al., 2016) promoting of international educational practices, commercialization of intellectual products (Loiko and Ramskyi, 2018). The labor markets have increased their demands for the future employees. The international education or training abroad is perceived as a “successful ticket” and is viewed as an advantage by many students over the other ones. Every professional needs to learn how to work with and next to the representatives of different countries and cultures. The study-abroad programs are an effective instrument and method to broaden the knowledge in a chosen issue, to get acquainted with the new information, to dive into the foreign culture and to experience the different educational methodologies and to improve the social skills (Evans et al., 2008; Presley et al., 2010; Hackney et al., 2012). Having a practice, training or studying in other country is particularly valuable for students who plan to build a career abroad. The EU's Erasmus for All program is a fine example of such professional and personal development, especially for students from Central and Eastern Europe (Black and Duhon, 2006; Teichler and Janson, 2007).

3. Materials and Methods

As materials of this study work programs implemented at the Russian State Agrarian University – Moscow Timiryazev Agricultural Academy – were used.

An exchange of views and pedagogical innovations was carried out in the process of writing this paper, with due regard for the students' opinion.

A comparison of the described Russian and foreign practices is carried out as well as their assessment from the point of view of significance, positive effect and complexity of implementation. Methods of modeling and visualization are used for better perception of the results of the study.

A large amount of practices containing new teaching methods implemented at foreign higher educational establishments and at the Russian State Agrarian University – Moscow Timiryazev Agricultural Academy were collected and analyzed. Two most interesting and relevant of them, in our view, are described in this publication. The defining competences of this direction include major problems of water management.

4. Results

Business simulation game implementations

The business simulation games emerged as an educational tool in the 1950s and have evolved from one of the business courses exercise to being a key part of business education (Faria et al., 2009). A simulation reflects a real object or situation to which a game component (competition, rules, winning and losing etc.) is added. Feinstein and Parks describe four patterns of simulation depending on its design and application (Feinstein and Parks, 2002). By the design simulation can be iconic or symbolic. Iconic simulation imitates visual, auditory and kinesthetic aspects of reality, and is implemented for training. Symbolic model reflects the probability distributions, mathematics, or can represent a simple object. By application the simulation can be analytical or instructional (Edelheim and Ueda, 2007). Analytical simulations reflect certain phenomena and are used for preliminary review during the decision-making. Instructional simulations, in turn, have educational and training functions. Educational simulation game is a structured scenario with a detailed system of rules, tasks and strategies that have been created with a particular purpose: to form specific competencies that can be directly transferred to the real world.

The application of the computer simulation game consists of the following steps:

1. Teacher's preparation for a lesson:
 - The determination of the topic and purpose of the application of computer simulation;
 - The development of a simulation script and instructions for its implementation;
 - The choosing of criteria to evaluate how the student performs;
 - The preparation of necessary software, computer model.
2. Goal setting and student motivation:
 - Updating the necessary knowledge;
 - Setting goals and objectives of the work;
 - Briefing on work.
3. Completing of a work:
 - Simulation game passage.
4. Summary and reflection:
 - Systematization and analysis of results;
 - Formulation of conclusions;
 - Presentation of results in the form of a report.
 - Self-analysis of students' work results, identification of difficulties;
 - Teacher's introspection of the results of the lesson, comparing them with the goals.

In simulation games learning takes place on every level. The play itself, decision making, its risks, costs and benefits, results and bonuses are the contextual information that should be learned by a player. The teamwork aspect of games makes the interaction far more personal than in the role plays, as it is shown on the Figure 1).



Figure 1:Simulation games is the way of interaction between the students and teacher

Business simulation game for the specialization “Water resources use” in Russia

Nowadays, water agencies and organizations have moved from strict hierarchy to a “flat” organization with the teams or autonomously operating units that have more responsibilities. The new structures demand professional staff with a number of abilities: good teamwork and compromise reaching, critical thinking, problem solving, using cross-functional communication etc. For the graduates of water programs all this means developing new knowledge, skills and competencies (Goi, 2018).

The main purpose of training is to prepare students for effective water management involving new information technologies (Ratkovich, 2014). The success in achieving this purpose, to a large extent, is determined by practice-oriented learning, which involves a more substantial share of practical training in comparison with the traditional education; extensive use of internships at enterprises as well as inviting qualified practitioners to conduct classroom sessions (Kruglikov, 2018).

One of the methods of practice-oriented teaching in demand currently is the business simulation game. The goal of the business simulation game for the specialization ‘Water resources use’ lies in acquiring practical skills

in target-setting and solving of water-related tasks arising from the problems of water supply, irrigation, improving the quality of water resources, protection from seasonal floods etc. (Ratkovich, 2014). An example of building a business simulation game used in practical training at the Russian State Agrarian University – Moscow Timiryazev Agricultural Academy is shown in the Figure 2.

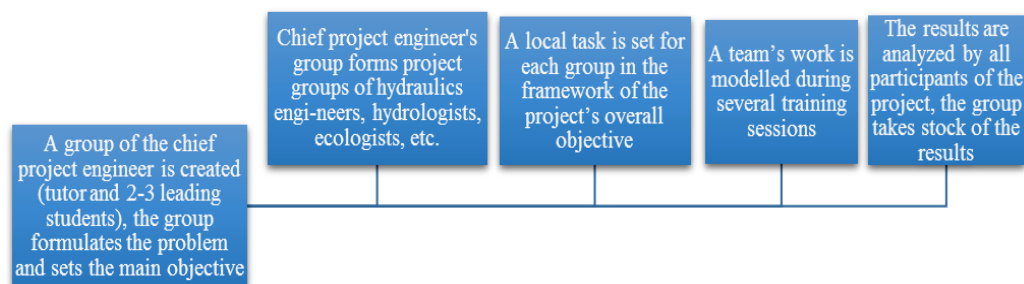


Figure 2:Flowchart of a business simulation game for the specialization ‘Water resources use’ (partly based on the data presented in (Ratkovich, 2014).

Virtual game project Aqua Republica

The analysis of the experience of foreign higher educational establishments indicates that a business simulation game can be not only real, but also virtual.

In game project *Aqua Republica*, the players influence the development of a virtual river basin and learn how their decisions reflect on nature. This game is aimed to raise the level of awareness of environmental problems and teach its participants the effective management of water resources, which involves sharing knowledge with others and paying attention to most critical spheres of the basin development.

The Shariva game real case study

Another example of a fictitious game is related to a real case study. *The Shariva (Shared River)* game is used for teaching the management and mitigation of floods. The players gain new scientific knowledge and learn to cooperate when working in transboundary river basins. The *Shariva* game has several parts: the first part introduces the participants to the flood problem and its risks, the second involves managing the transboundary conflicts and water governance, and the third part introduces the players to technical tools for solving transboundary problems (Douven et al, 2014).

Invitational Drought Tournament game

The game that has been presented by Hill et al (Hill et al., 2014) is called the *Invitational Drought Tournament (IDT)*. It is aimed to increase the participants’ drought awareness. The playground is one of the two river basins modelled after the real-world prototypes. The game lasts for one day and has been tested not only by students but also by water managers and stakeholders. IDT has three or four rounds which have different scenario depending on the climate data (stream flow, snowpack, precipitation, temperature and water demand), socioeconomic situation and the influence of environment. Every team can choose from a variety of strategies to invent a management plan to present to the other teams. Each plan is voted to find out the one which the best suitable for solving the drought problem on the river basin.

Ravilla simulation game

Sharing the same approach is the *Ravilla* simulation game presented by Rusca et al. (2012). Its main aim is to learn the water management by the example of virtual Ra Basin. The target audience are UNESCO-IHE students. *Ravilla* has four stages: to analyze a situation with the data given to the players, the management option selection, the application of the chosen model and analysis of the results.

Main advantages of a business simulation game

The major problem of implementing a similar practice in Russian universities is seen in the need to have a high level of logistics. Summing up the foregoing, we shall note the main advantages of a business simulation game (both real and virtual):

- The practical reinforcing of the knowledge on the subject, the participants learn to work in a team while thinking autonomously, show leadership, build self-esteem.
- The play form includes the component of social interaction, preparing for professional communication.

- The play component contributes to greater involvement of the project's participants and, consequently, helps achieve better results.

- The participants are able to take part in the game not only within the premises of the university, but also outside. This example is a demonstration of blended synchronous learning (Kaur, 2013), which is already widespread in the leading universities of the world, however little represented in Russia, especially on the periphery.

The example of implementation of virtual world to facilitate learning of Chinese demonstrates high interest on the part of students, who point out the resemblance of the virtual events to reality, simultaneous opportunity to act jointly and exercise autonomous thinking (Bower, 2015).

Empirical training abroad: development of a practical training course

The relevant method of implementing practice-oriented learning combined with another significant function of modern education – socialization in the conditions of a global world – is the empirical training abroad. The Russian students are actively involved into the European educational programs. The likely explanation is that the European universities (especially the ones in Germany, Great Britain and France) have high reputation on the labor market. Recently the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) started to develop their cooperation in the students' mobility educational and training programs. The priorities in the higher education cooperation are focused on three main aspects: university cooperation and modernization, academic mobility and the promotion of the multidisciplinary studies. The main points of the cooperation are the founding of the European Higher Education Area (EHEA) and the implementation of Bologna process. The Tempus and Erasmus Mundus programs are among the most important forms of the cooperation between the European Union countries and Russia. The Tempus program deals with the modernization of the universities and Erasmus program operates in the field of academic mobility (Korteniemi, 2011).

Two options of seasonal practice in Europe (France, Germany) are planned by the Russian State Agrarian University — Moscow Timiryazev Agricultural Academy for 2019. The partners are the ESA, École supérieure d'agriculture d'Angers, and AgrarKontakte International, Stuttgart, respectively.

Both options envisage internship of students in real conditions with accommodation provided by farmers' families. The duration of internship in Germany is 8 months, in France — 1 or 2 months depending on the student's choice.

The experience of previous years indicates that interns provide positive feedback about this method. From the student's review (The official site of the RSAU-Moscow..., 2017):

'In April 2017, I took part in a training internship in Italy. This internship was in the framework of a joint project of the Timiryazev Academy and Sant'Anna School... I got interested in this internship because of the opportunity to learn about education in Italy through my own experience and visit nurseries of fruit and ornamental crops ... I was amazed by the Italians' approach to environment... The internship fully met my expectations. I not only saw live what I read in textbooks, but also met interesting people...'

Besides seasonal practice, students of the Timiryazev Academy have a chance to take part in international Erasmus + mobility programs and various inter-university projects.

One more example of successful development of a practical training course abroad is described in detail in the work of M.A. Beckie and R. Berezan (2017) 'Engaging with Cuba's permaculture movement through transformative learning'.

This experimental program of training abroad has been developed in the framework of Canadian and Cuban partnership with the aim to facilitate intercultural learning of participants from Canada and Cuba and has been functioning since 2010. The course duration is 7 weeks and, in contrast to the traditional classroom teaching, it gives Canadian students a chance to learn from Cuban practitioners who work in their native sociocultural environment.

A blended learning model is used in the program, its structure is demonstrated in Figure 3.

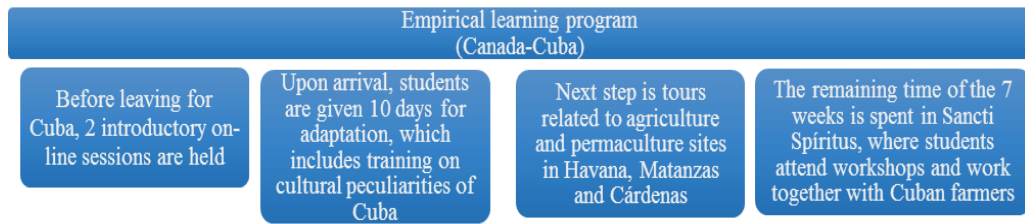


Figure 3:Structure of the practical training course for Canadian students in Cuba (based on the data presented in [32])

At the end of the program, participants receive a FANJ Certificate and academic credits in a three-credit course on sustainable urban agriculture and permaculture offered through the Faculty of Graduate Studies and Research of the University of Alberta (The official site of the RSAU-Moscow..., 2017). The main stages of implementation are presented in the flowchart (Figure 4).



Figure 4:Flowchart of organization of empirical training abroad

The positive impact of the described methods includes the opportunity to receive additional professional knowledge and experience, a chance to learn about another culture, practice a foreign language, etc. The difficulties of implementation are connected with organizational issues and problems of logistics.

5. Discussion and Conclusion

This study underscores the high relevance of foreign practices in the present-day reality, when the internationalization of higher education is the top priority for the developed and developing countries alike (Guri-Rosenblit, 2015).

New methods and innovations, correctly synthesized in the learning process, improve the quality of education, including in higher educational establishments in the area of agriculture. For example, multitasking at a laptop during lectures distracts both users and fellow-students, harms understanding of the lecture and has a negative impact on the final results (Sana et al., 2013), while “the declared principle of practice-oriented learning, not underpinned by a theoretical basis, does not enable an average university graduate to acquire such competences as mobility, flexibility and adaptability, readiness to change place and profile of work, which are in high demand presently” (Kruglikov, 2018, p. 65).

The formula of a new method in higher education in a simplified form can be described as follows: (traditional method) + (technological innovation) = (new method). For example, (students’ conference) + (the Internet) = (on-line conference), etc.

For the education to be effective, the methods should be dynamic and innovative, aimed at developing autonomous thinking; however, we observe a trend that implementing new methods depends on local capacities, logistics. As a teaching method the business simulation games has a number of undoubted advantages:

- variability of model behavior due to changes in its parameters and development of the ability to respond quickly to a changed situation;
- teaching a systematic approach to assessing a phenomenon or object;
- developing teamwork skills and responsibility for its results;
- the ability to test various hypotheses that do not require special security measures and allow to evaluate the fallacy or correctness of the selected solutions.

Blended learning methods present great interest and value for increasing the level of higher education, integrating practices of metaliteracy (Ibrahim and Nat, 2019; Ma et al., 2019). The most progressive is the use of multi-purpose methodological developments and programs that enable the participants not only to improve academic knowledge, but also contribute to better adaptation to the reality of the modern world.

The international mobility of the students is growing. Nowadays labor market demands the well-educated, highly trained professionals. In many countries, university degrees do not guarantee well paid job. The training abroad is a good opportunity for the students to get new experience and to raise their level of knowledge becoming competitive among the others. With the variety of the cooperation programs between the universities from the different countries, Erasmus exchange program, etc. the students have a possibility to choose a training abroad “path” that corresponds their possibilities skills and intellectual demands (Byram and Dervin, 2009).

After analyzing the obtained results and the works of the aforementioned researchers we are able to make the following conclusions. The greatest interest and value for increasing the level of higher education lie in the blended training models containing new methods oriented at autonomous thinking reinforced by scientific and technical innovation.

There are no universal teaching methods in higher education. The relevant methods are developing in today’s reality, they are a response to the demands and needs of the area of knowledge application, the state, society, with regard for the globalization of the world and are based, to a great extent, on the progress in science and technology. Alongside with this, the value of practical methods is increasing.

Comparing the Russian and Canadian experience of empirical training abroad, in particular the examples considered here, we can conclude that the latter looks more multi-faceted, however also holistic and innovative and more functional as it includes both direct practice and training blocks in harmony with overall structure, as well as preparatory on-line introduction.

High results from the implementation of new methods are yielded with the use of a step-by-step approach, which is a chain of testing and adjustments.

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