Interactive technology of pedagogical assistance as a means of adaptation of foreign first-year students

M. A. Odinokaya *, I. A. Karpovich 2, O. Ju. Mikhailova 1, A. N. Piatnitsky 4, Blanka Klímová 5

1234Peter the Great St.Petersburg Polytechnic University, St.Petersburg, Russian Federation
5 Univerzita Hradec Králové, Hradecká, Czech Republic

*E-mail: World.Maria@hotmail.com

Abstract. The relevance of this study and its social significance are due the need to improve the readiness of the foreign first-year students for the learning process in educational environment of a Russian technical university. The purpose of the article is to develop an interactive technology of pedagogical assistance, identifying the features of adaptation of foreign first-year students. To assess the adaptation process we estimated: students’ motivation toward science learning, their abilities of self-regulation in the learning process and classroom climate. The effectiveness of the proposed model is confirmed by the results of a pedagogical experiment, using proven, valid questionnaires on the subject of the study. On the basis of the obtained results, it is proved that to improve the quality of training of foreign students, it is necessary to take into account their motives, cognitive style of mastering the educational material, the used educational strategies and features of the organization of communication in the educational group. Most effectively, these factors can be taken into account in the organization of pedagogical assistance of the adaptation process through the electronic educational environment of university.

1. Introduction

In light of the internationalization of education, one of the priority, relevant and promising areas in the development of the Russian Federation is the aspect of international cooperation in the field of education. The relevance of the study is determined by the intensification and deepening of international, including educational, contacts. Cooperation in the field of education is one of the most important and urgent tasks of many countries, since it is the training of students that plays an important role in the process of spiritual interaction, and hence the rapprochement of peoples, the integration of the world community, for which technical universities are a favourable environment [1,2,4,5,6-8]. The presence among students of representatives of different countries and peoples is the subject of the property of any university, helps to improve and strengthen the prestige and status of the educational institution, and the very stay of a foreign student becomes a source of international relations and a means of forming a favourable perception of a foreign student. Currently, in modern society has increased the exchange of students, their departure for long-term education abroad, in particular, in the Russian Federation. The fundamental nature of Russian higher education is one of the decisive factors in favor of studying at a Russian university. In the course of these changes, the need to develop the issues of adaptation of foreign students to the conditions of study in the Russian technical university became even more acute.
By adaptation we mean the prerequisite for successful activity and its necessary condition. This is a positive value of adaptation for the successful functioning of the student in a particular social role. Adaptation means adaptation to the nature, content, conditions and organization of the educational process, development of skills of independence in educational work [9]. Adaptation approach in training of students - prevention or mitigation of negative manifestations of crises in the adaptation of freshmen by creating appropriate conditions for the functioning of psychological mechanisms at the cognitive, emotional, behavioral, semantic levels of their professional development.

Scientific research on this topic is also important when considering cross-cultural relations, due to the increase in migration activity in the world. The analysis of literature and best practices indicates the nature of the activities for the adaptation of foreign students [10,11,12, etc.]. So, to date, the work on adaptation to training at the university has not been systematized, in particular, the ways to identify adaptation difficulties have not been ordered; the directions of activity allowing to carry out professional adaptation of foreign first-year students are not allocated and systemically aren't presented; those technological opportunities aren't emphasized. At the same time, in our opinion, it is the interactive technology of pedagogical assistance that can become the necessary condition that will allow a foreign first-year student to join a new educational process in the Russian technical university successfully.

The purpose of the study is to theoretically substantiate, design and verify the interactive technology of pedagogical assistance. The object of the study is the process of adaptation of foreign first-year students to study in the Russian technical university. The subject of research is the design of interactive technology of pedagogical assistance.

As a hypothesis of the study, it was suggested that the process of adaptation of foreign first-year students in the Russian technical university on the basis of activation of their self-regulation will ensure their effective entry into the sphere of socialization, if: the concept of adaptation to learning will be based on a competence-based approach that aims teachers to support the forces of educational self-regulation of foreign first-year students in the educational process; the initial point of adaptation of foreign first-year students will be diagnostics of their readiness for training in the Russian technical university, an interactive technology of pedagogical assistance to foreign first-year students will be developed, which has the greatest opportunities to stimulate their potential for educational self-regulation aimed at eliminating adaptation difficulties; pedagogical support of foreign first-year students in mastering the skills of independent cognitive activity through the introduction of interactive technology of pedagogical assistance; with the help of interactive technology will be supported by the entry of foreign first-year students in the educational environment of the Russian higher education institution; will be carried out systematic monitoring of the ongoing adaptation to identify, assess, adjust.

In accordance with the purpose, subject and hypothesis of the study, the following tasks were defined and solved. 1. To study the state of the problem in the scientific, methodological and pedagogical literature and best practices of the adaptation process in higher education. 2. To identify and justify the nature of the primary adaptive difficulties arising from foreign first-year students. 3. To identify the dependence of the successful adaptation of foreign first-year students to study in the Russian technical university on their involvement in professional self-regulation. 4. To distribute the conditions of pedagogical support for the adaptation of foreign first-year students to study in the Russian technical university. 5. To develop and experimentally test the interactive technology of pedagogical assistance, based on the actualization of self-regulation of foreign first-year students, as well as to identify the results of testing shortcomings, make the necessary adjustments to the educational process for subsequent implementation.

The novelty of the research results is that for the first time the success of the adaptation of foreign first-year students in the Russian technical university is considered as a consequence of their active position in the educational process, their involvement in professional self-regulation. In this regard, a significantly new set of means of pedagogical support for the adaptation of foreign first-year students...
to study in the Russian technical university, based on a corresponding set of problem-creative tasks and situations of pedagogical support of their entry into the environment of the Russian university.

The theoretical significance of the work is due to the fact that the results of theoretical and empirical research: make a significant contribution to the understanding of general and specific patterns of adaptation of foreign first-year students in the period of training in the Russian technical university; significantly concretize, complement and deepen the knowledge of the adaptation of foreign first-year students, which is an increase in scientific knowledge in the theory of adaptation processes; prove the legitimacy of the introduction of the developed interactive technology of pedagogical assistance in the training course. The theoretical significance of the research results also lies in the fact that it contributes to the further development of the theory of higher professional education, designed in the light of the competence approach, in justifying the specific purpose of the adaptation stage for the further professional development of future professional staff. The practical significance of the study is to develop an interactive technology of pedagogical assistance, ensuring the success of the adaptation processes of foreign first-year students in the Russian technical university.

Under the interactive technology of pedagogical assistance of foreign first-year students, we understand a set of consistent pedagogical actions, during which the problems of adaptation of students to a new sphere of life, to a new style of learning in the Russian technical university and the environment of professional communication, to the experience of self-organization, consistently moving from the control of the teacher in a targeted professional self-regulation. The main feature of the process of pedagogical assistance is the auxiliary nature, which is manifested in the accompaniment of any other process, providing it with the necessary electronic resources.

For pedagogical science and practice the task of research of personal and professional formation of graduates in the Russian technical university, finding additional resources, in particular, electronic resources [13,14,15, 30 etc.], in the organization of work with foreign students aimed at maintaining these processes has always been significant. In connection with the ongoing processes of Informatization of education, the leading role of the teacher is to support the learning process of the student. In the modern educational process, the teacher's assistance is manifested in the creation of special conditions for the student's transition from teacher support to self-help, as well as the special organization of the student's learning process.

Extrapolating the concept of "assistance" in the pedagogical plane, different researchers define its essence in different ways. To some extent, these approaches define the canvas for the formation of our author's concept of pedagogical assistance to the adaptation of students. The structure of the concept of "assistance" includes support and assistance [16]. It should be recognized that this position seems to us legitimate and justified, including in the context of the consideration of the problem of pedagogical assistance to the adaptation of the student. Under pedagogical assistance, we understand the pedagogical specially organized activity of the educational process aimed at creating conditions for the successful adaptation of foreign first-year students to the environment of the Russian university. Pedagogical support involves equipping pedagogical assistance with the necessary resources that contribute to the successful adaptation of foreign first-year students.

According to various researchers, the majority of foreign first-year students have problems in the first examination session. One of the main reasons for the educational difficulties of foreign first-year students is language difficulties, insufficient level of actual preparedness for the secondary school program, neglect of many knowledge from the courses of school disciplines, underdevelopment of concentration and distribution of attention, weakness of volitional regulation [17]. No less problems are experienced by foreign first-year students and in communication, both with teachers and fellow students. Adaptation of foreign first-year students to the new training regime continues throughout the first half of the year. It is necessary to promote the creation of conditions for the successful adaptation of foreign students to the new situation. One of the priorities of the teacher of the Russian technical university is to provide foreign students with quality information about the real conditions of education, to acquaint with high educational and disciplinary requirements. In our opinion, it is most
expedient and especially important to provide pedagogical assistance to foreign first-year students through specially organized activities. The use of the author's technology of pedagogical assistance of foreign first-year students can contribute to the creation of conditions for their successful adaptation in the Russian technical university.

Among the favourable factors contributing to the successful adaptation of foreign first-year students, we can distinguish the following: motivation for learning activities, the climate in the study group and the ability of students to self-regulation. The initial leading motives for entering the university for first-year students are very diverse. This is the interest in the profession, and the prospects to find a job after training, and the prestige of higher education as such, etc. As a rule, it is easy to adapt to student life to a greater extent, students motivated by interest in the profession, the presence of abilities, inclinations to it. The problem of adaptation is determined not only by the educational process at the university, for many students it is associated with the need to leave home, leave family, friends, dramatically change the usual living conditions, daily routine, food, etc. A foreign first-year student is considered adapted to the new conditions of study in the Russian university, if: being among fellow students, established interpersonal contact. In the new environment, changing the circle of communication, a new role distribution, the student has to "defend" their position, to assert themselves in the new team. In addition, a first-year student is considered to be adapted if he is interested in learning, is able to independently organize the process of mastering educational activities and has the skills of rational time planning, in other words, is capable of self-regulation of educational activities.

Creating conditions for the successful inclusion of students in the educational process from the first days of stay at the university is one of the priorities of higher education. The degree and speed of adaptation of first-year students largely affect the success of training at the university, the psychological comfort of students, their satisfaction with the choice of specialty, learning outcomes, student life and relationships in the study group. According to Russian and foreign studies [18, 19, etc.], the problems faced by first-year students in the cognitive, psychological and value-motivational spheres of adaptation to the educational process are expressed in the difficulties with the establishment of interpersonal contacts, weak motivation to learn, low normative behaviour, refusal to fulfill educational requirements and poor attendance. Such students are particularly exposed to the stressful effects of examination sessions, which leads to an increase in the level of anxiety, emotional instability, impulsiveness, irritability, low tolerance towards frustration.

Even more difficult is the process of adaptation of foreign students studying in Russian universities [20]. In addition to the above problems, they need to overcome the language barrier and get used to the realities of socio-cultural nature. Thus, the adaptation of a foreign student is a complex, dynamic, multi-level and multilateral process of restructuring the need-motivational sphere, a set of existing skills and habits in accordance with the new conditions. The issues of training of foreign students in Russian universities are covered in modern studies by such foreign and Russian researchers as [21,22,23,24, etc.], but at the moment there is no clear technology of pedagogical assistance, which allows to bring the training of foreign students to a new level and enables the university teacher to effectively and with the least time to organize the educational process in groups of foreign students.

As criteria of an estimation of efficiency of technology of pedagogical assistance in the Russian technical universities, we used: the satisfaction of student to high school training, including assimilation of accepted social norms and values; the subjective perception of the terms and content of the educational process; satisfaction with the immediate environment; the relationship with the teacher, fellow students; orientation to continuing education, self-assessment of satisfaction with own educational success; activity in learning activities (attendance of training sessions); the effectiveness of the training (performance); the presence or absence of pronounced signs of discomfort in the performance of training activities.

2. Methods
At the present stage of development of Russian education there is an increased attention to the study of problems associated with the development and introduction of new technologies in the educational process, including interactive learning technologies. Interactive technologies are characterized by flexibility of approach to different contingent of students; creates optimal conditions for their interaction, increasing their motivation and interest in the studied discipline; allow teachers to realize their creative initiative. Such initiatives and the use of interactive forms of learning using computer technology contribute to the implementation of practice-oriented competence approach. For the Russian technical university, the use of such technologies is mandatory in the conditions of Informatization of society and modern requirements of the GEF.

Application of the interactive technology of pedagogical assistance developed by us, which contributes to the creation of conditions for successful adaptation of students in the Russian technical university, will help the teacher to solve the difficulties faced by foreign first-year students. Providing students with the opportunity to understand, fix the gap and take the right steps through the implementation of the algorithmic prescription gives real prospects for improving the quality of education in the Russian technical university, especially for a weak contingent of first-year students, and in the future, can help students to self-regulate educational activities [25].

Many researchers offer their learning algorithms depending on the learning objectives and the audience of students [26, 27, 28, 29 etc.]. We offer one of the possible algorithms for organizing the activities of first-year students, contributing to the creation of conditions for successful adaptation of students in the Russian technical university (Table 1). The technology is recommended for use in all disciplines studied by foreign students during the first semester. A pilot study to assess the effectiveness of the proposed technology was conducted in the framework of the discipline "Foreign language. Professionally-oriented course".

**Table 1.** Interactive technology of pedagogical assistance, contributing to the creation of conditions for the successful adaptation of foreign first-year students in the Russian technical university

| Step 1. PREPARATORY |
|----------------------|
| Foreign first-year students get acquainted with the purpose and objectives; the teacher determines the subject of classes, gives instructions, introduces foreign first-year students to an interactive social service, solves one or more educational problems |

| Step 2. PROCEDURAL |
|-------------------|
| The teacher monitors the work of foreign first-year students; foreign first-year students choose a problem, offer an algorithm for its solution, discuss; solve it online; create scripts for the report; make a presentation of their solutions in the classroom. |

| Step 3 FINAL |
|--------------|
| Students analyze their mistakes and discuss the results; the teacher evaluates. |

Interactive technology of pedagogical assistance, contributing to the creation of conditions for the successful adaptation of foreign first-year students in the Russian technical university, involves several stages. At the preparatory stage, foreign first-year students get acquainted with the purpose and objectives of the upcoming training activities. The teacher determines the subject of training sessions, explains to foreign first-year students what their training activities will consist of, what the final learning result they should get, what will be the evaluation criteria for each training task. The work of students is organized through the electronic educational environment of SPbPU (http://open.spbstu.ru/), which combines open educational, scientific and educational resources and is the main point of access to all open information and educational resources of SPbPU. Electronic educational environment of SPbPU provides the following opportunities: access to curricula, library publications, electronic educational resources; fixing the progress of the educational process, the results of the interim certification and the results of the development of basic educational programs; conducting all types of classes, procedures for assessing the learning results; the formation of an
At the second, procedural stage, the choice of the educational task is carried out, the algorithm of its decision is made. The teacher in the classroom writes on the board solutions proposed by students. Then, divided into pairs and dividing the problem tasks, students make a dialogue in the form of scripts to solve it. The teacher listens to each pair and helps, if necessary, by monitoring their work. After the classroom, students expect independent work in the electronic educational environment. Their task is to write and publish scripts, as well as create screenshots to demonstrate the result in the classroom. In addition to the completed task, they must comply with the time limit, according to the instructions received from the teacher. The teacher makes interactive monitoring of work, advises students online. Then, at this stage, interactive classroom activities are carried out, namely the presentation of the project in pairs in front of the audience in the group. The teacher monitors the performance of this element of work and finds out the difficult moments. Students ask each other questions.

At the third evaluation stage, students evaluate their work and the degree of its compliance with the original algorithm, analyze errors, draw conclusions. The teacher uses evaluation criteria and comments on the work. The work organized in this way contributes, in our opinion, to the conditions of successful adaptation of foreign first-year students, thanks to the reflective component, critical thinking, open dialogue with the teacher and fellow students. Each stage contains measures for control, self-control, self-regulation.

The work includes the basic components of Electronic information and educational environment of SPbPU: the Portal "Open Polytech" (http://open.spbstu.ru/), "Repository of curricula" (https://plan.spbstu.ru/), a Personal account of the Student (http://lk.spbstu.ru/), video conferencing System (http://acs.spbstu.ru), the online Service of proctoring (https://proctor.spbstu.ru/), Corporate e-mail students and staff (http://mymail.spbstu.ru), Information and library complex (http://library.spbstu.ru/ru/).

The effectiveness of the use of the developed interactive technology of pedagogical assistance is confirmed by the results of the pedagogical experiment. The study was conducted on the material of the course "Foreign language. Professionally-oriented course" (10 lessons of 1.5 hours twice a month). The experimental study involved a focus group of foreign first-year students from 47 people studying at SPbPU. The group was divided into control and experimental (23 people in the experimental group and 24 - in the control group. The control group was engaged in the traditional program without the use of interactive technology of pedagogical assistance. The experimental group was trained in the mode of using the developed interactive technology, carried out the solution of problem educational tasks, choosing the optimal algorithm, created a presentation of its scripts using an electronic learning environment, increasing motivation and interest in the discipline, which, in turn, contributed to the increase in the level of formation of communicative competence, and contributed to the resolution of tasks.

At the initial and final stages of the experiment, an electronic survey of foreign first-year students was conducted, which included questionnaires covering such topics as: motivation for educational activities (Students’ motivation Howard science learning (SMTSL)) [31], features of the relationship in the study group (Measurement of Classroom Climate) [32], features of self-regulation of the educational process (Self-regulation as a stimulus to student learning activities) [25]. This study was conducted anonymously in order to organize correctional work with foreign first-year students and became a substantial basis for the development of guidelines for the successful adaptation process in the Russian technical university. The tests meet the required quality indicators for a psycho-diagnostic toolkit: validity, reliability, accuracy, and a standardized view.

3. Results and Discussion
The analysis of the results obtained due to the use of interactive technology of pedagogical support, allowed to draw the following conclusions. There is a close relationship between pedagogical assistance and the nature of educational activity of the student: involvement in the educational process of pedagogical assistance contributes to the better success of educational activities of students. Tables 2, 3 present the results of the ascertaining and control stages of the experiment to assess the cognitive and motivational spheres of adaptation, for which the questionnaires were used Students’ motivation toward science learning (SMTSL) и Self-regulation as a stimulus to student learning activities.

**Table 2. Students’ motivation toward science learning (SMTSL)**

|                | Initial Stage of the Experiment |               |               |
|----------------|--------------------------------|---------------|---------------|
|                | Low level of motivation         | Average level of motivation | High level of motivation |
| Control Group  | 17%                            | 62%           | 21%           |
| Experimental Group | 13%                        | 61%           | 26 %          |

|                | Final Stage of the Experiment |               |               |
|----------------|--------------------------------|---------------|---------------|
|                | Low level of motivation         | Average level of motivation | High level of motivation |
| Control Group  | 8%                             | 67%           | 25%           |
| Experimental Group | 4%                         | 61%           | 35%           |

**Table 3. Self-regulation as a stimulus to student learning activities**

|                | Initial Stage of the Experiment |               |               |
|----------------|--------------------------------|---------------|---------------|
|                | Low level of self-regulation    | Average level of self-regulation | High level of self-regulation |
| Control Group  | 38%                            | 54%           | 8%            |
| Experimental Group | 35%                        | 61%           | 4%            |

|                | Final Stage of the Experiment |               |               |
|----------------|--------------------------------|---------------|---------------|
|                | Low level of self-regulation    | Average level of self-regulation | High level of self-regulation |
| Control Group  | 29%                            | 63%           | 8%            |
A positive pattern can be observed in regard to motivation. As it can be seen from Table 2, the number of students with a low level of motivation decreased both in the experimental and control groups, from 13% to 4% and from 17% to 8% respectively. The number of students with an average level remained the same in the experimental group and rose in the control group from 62% to 67%, while the increase of the number of students with a high level of motivation rose more significantly in the experimental group (from 26 to 35).

At the final stage of the experiment the level of student self-regulation has increased compared to the initial stage. The percentage of 1st-Year students with low level of self-regulation changed from 38% to 29% in the control group and from 35% to 8% in the experimental group. The percentage of students with average level of self-regulation increased from 54% to 63% in the control group and from 61% to 78% in the experimental group. The number of students with a high level of self-regulation remained the same in control group and went up in the experimental group from 4% to 14%.

A positive trend can also be noticed in experimental groups in regard to classroom climate. Three factors were assessed with a scale from 1-5) 1) managing learning activity by teachers to respond to individual learning needs, 2) encouraging students to participate in learning activities, and 3) supporting students to achieve their learning. The results of initial and final stages of experiment can be seen in Table 4.

| Table 4. Measurement of Classroom Climate |
|------------------------------------------|
| **Initial Stage of the Experiment**     |
| Respond to individual learning needs | Students encouragement to participate in learning activities | Students’ support |
| Control Group                          | 2 | 3 | 2 |
| Experimental Group                     | 1 | 3 | 2 |
| **Final Stage of the Experiment**      |
| Respond to individual learning needs | Students encouragement to participate in learning activities | Students’ support |
| Control Group                          | 2 | 2 | 3 |
| Experimental Group                     | 3 | 5 | 5 |

As it can be seen, the climate in experimental groups improved more, than in control groups. The considered dependences suggest that the determining factor in the process of adaptation of a foreign
first-year student is the creation of favourable conditions for their learning activities, which is achieved through its organization and individual participation of each student, which ultimately contributes to greater involvement of students in the learning process, the ability to overcome difficulties that impede the process of knowledge and develop qualities that ensure self-regulation of their learning activities. Focusing on the results of this study, teachers and students can significantly reduce the time of adaptation of foreign first-year students, more consciously and effectively participate in their educational activities. Thus, the analysis of the research showed the need to use the technology of interactive pedagogical support.

The used interactive technology of pedagogical assistance allows to ensure the success of the educational task, distributing the load of its individual elements of performance; constructively solve the educational problem, which, in turn, contributes to the levelling of failures of volitional control over the emotional sphere, contributes to improving academic performance. Also, the use of technology contributes to more flexible adaptation to changes in the content of the educational process, in particular, to use several sources, including electronic resources; to the more flexible nature of the course of systematic monitoring and evaluation; more flexible nature of the relationship of the teacher and the student. The teacher sees the student as an independent person, endowed with a greater degree of responsibility and able to self-regulate their own educational activities. In addition, the use of interactive technology contributes to the adaptation to the new requirements of the university, and to the new learning environment. In other words, adaptation to educational activities involves the simultaneous impact of a number of influences, including both depending mainly on the students themselves, and to a greater extent dependent on external circumstances, factors, which include the content and organization of the educational activities in the Russian technical university. Both in the experimental and in the control group there is a contingent of respondents with a low rate of successful adaptation to the university environment. The data obtained indicates that there is a list of problematic issues that must be resolved for the successful process of adaptation of first-year students. In order to change the situation, it is necessary to carry out purposeful systematic work aimed at improving the level of adaptation of foreign first-year students. According to the results, we can say that the testing of the developed interactive technology of pedagogical assistance in view of the high rates of respondents on these provisions was successful.

4. Conclusion

Generalization and analysis of the results of the theoretical and experimental research allows us to draw conclusions about the goals and content of interactive technology of pedagogical assistance in a Russian technical university, and also allows us to state the shift of emphasis from the problem points in the learning process in the direction of determining ways of support; readiness of foreign first-year students to successfully overcome adaptation barriers; guaranteed provision of conditions for foreign first-year students to adapt to the new environment, structure, content and requirements of the Russian technical university.

The purpose of the study was to develop an interactive technology of pedagogical assistance, identifying the features of adaptation of foreign first-year students. We have achieved the following results:

1) we have carried out a theoretical analysis of domestic and foreign pedagogical theory, practice, and experience of solutions to the problem of adaptation of the 1st year students and aspects of training of foreign students in Russian universities.
2) we have developed a technology of pedagogical assistance of adaptation of foreign students based on the use of electronic educational environment of the university, which can be successfully used to eliminate the negative impact of problems faced in the process of adaptation.
3) we have assessed the effectiveness of the proposed technology, implemented in the course of practical training within the discipline "foreign language". It is confirmed by the results of a pedagogical experiment focused on the following areas: cognitive, motivational and social. Positive tendencies were noted in each of the following fields. Namely, the number of students with a low level
of motivation decreased both in the experimental groups from 13% to 4%, whereas the number of students with a high level of motivation rose significantly (from 26% to 35%). The percentage of 1st-Year students with low level of self-regulation changed from 35% to 8%. The percentage of students with high self-regulation level went up in the experimental group from 4% to 14%. A positive trend was also noticed in regard to classroom climate. It refers to such aspects as managing learning activity by teachers to respond to individual learning needs, encouraging students to participate in learning activities, and supporting students to achieve their learning.

The results and conclusions can be further used in the practice of pedagogical education by teachers of Russian technical universities and introduced into the educational systems of universities.

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