

Training of future teachers for mentoring in the conditions of the electronic information and educational environment of the university in the implementation of educational projects in small groups

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Abstract — The purpose of the article is to describe the technology of training of future teachers for mentoring in the conditions of the electronic information and educational environment of the university in the implementation of educational projects in small groups

Methods used in the work: analysis of information sources on the problem; analysis of federal state educational standards of higher education, pedagogical experiment, mathematical processing of results.

The article proposes a technology of training for mentoring, based on the formation of the communicative competence of future teachers in the process of their professional training. The technology includes didactic support, a target component, levels of preparedness for mentoring, parameters and indicators of the development of relevant competencies. The electronic information environment, the distance educational system (DES) is used, the work of students on educational projects is organized in small groups. In training for the mentoring activity.

Keywords — *mentoring, communicative competence, teacher training, the work of students in small groups, e-learning.*

I. INTRODUCTION

Modernization of the education system in Russia is based on a qualitative human resource base - teachers with professional competencies who provide the ability to share meaningful experience, knowledge and citizenship with their colleagues. That is why the readiness for mentoring becomes absolutely necessary which means that future teachers will be trained for mentoring activity.

The concept of mentoring is ambiguously interpreted in the education system. There are different approaches to the definition of mentoring [1]. This is due to the versatility of the concept [2]. There are many types of mentoring [3, 11, 14]

often contradictory and methodologically unrelated. Subject approaches to the description of the mentoring process, the requirements to the results of the process and the forms of organization are different.

Nevertheless, it is possible to identify general trends in the descriptions of the conceptual apparatus of the process of mentoring presented in the Russian and foreign literature. Thus, it is noted that the mentoring process is directly related to the process of developing the personal and professional qualities of the teacher in many sources [3, 4, 11]. Mentoring is defined as the support of novice teachers by their more experienced colleagues in the most traditional practice of the educational process [4], in this context it is meant that the mentor should be a more advanced teacher with experience and large experience in teaching [5].

There is a traditional approach to defining the concept of mentoring which implies that the educational process concentrated in three components: preparing for a class, conducting a class and analyzing a class, should provide an active role for a mentor which is reduced to monitoring of the lesson and formulating tips [6].

Innovative approaches to mentoring are associated, to a greater extent, with the use of information and communication technologies, for example, nowadays the distance forms of learning associated with the use of special software are becoming increasingly important. There are new difficulties in the organization of mentoring connected with the fact that the teacher faces two categories of challenges: caused by the organization of distance learning (logistical) and the traditional educational challenges [7].

Abroad, at the present stage, the concepts of mentoring in the field of education are also diverse, but everyone sees

mentoring as the only possible way of adapting beginning teachers (neophyte teachers, beginning teachers) and active support in overcoming the crisis of the first years of work. The Australian Primary Principals' Association provides data that 24% of teachers intend to leave an educational institution during the first 5 years of work [8]. The problem of adaptation of beginning teachers is relevant in Europe [9] and in South Africa [10]. According to other researchers, about a third of beginning teachers tend to leave their jobs during 2 years, and 10% have firmly decided to leave school. One of the main reasons is the disparity in expectations as compared to that of the real educational practice [12]. The statistics are confirmed by official data in Russia.

That is why mentoring programs are organized that solve not only the problem of the adaption of beginning teachers, but also make it possible to identify those young teachers who are not part of the teaching profession in Russia and many countries [13]. It is important to note that, in contrast to the traditional approach, a teacher with less experience, who is younger or have a small set of professional achievements can work as a mentor in these programs. One of the reasons for it is the renewal of school education, the introduction of new forms, methods and content of education. In these situations, a beginning teacher is often a mentor for the more experienced, specifically in the field of using information technologies, communications and new forms of group work [14]. Besides, there is an experience when, in addition to individual mentoring, group mentoring is practiced, that is, a group of beginning teachers or students is assigned to a mentor [11].

Mentoring is particularly meaningful and important in an inclusive learning situation. Each teacher, who first faced teaching children with special educational needs, has an urgent need to rely on the experience of teachers already working with such children.

One of the main tasks of a mentor is to help a colleague teacher in improving their professional level, in the development of personal qualities, necessary for a teacher, communication and management skills. The professional competence of the teacher in the field used in the educational process of information and communication technologies is especially important. In order to accomplish the task, the administration of an educational institution should consider the following when appointing a mentor: A teacher who is a mentor should have competences in the field of ICT and their use in professional activity, communicative skills, and working experience in the electronic educational environment [15].

In this study, we used the results of the Russian and foreign studies on mentoring, containing descriptions of the requirements to personal qualities of a mentor [16, 27], descriptions of the conditions necessary for the implementation of mentoring activity [17, 27], a list of functions that will provide the necessary result of mentoring in the teaching staff [18]. That is why, the second most significant purpose of this study is to develop a methodology for training future teachers in a pedagogical university to act as a mentor for colleagues in the field of information technology.

In accordance with the purpose of the work, the following key areas of student mentoring were formulated for the organization of training and the development of topics and requirements to educational projects: developing a program of

personal professional growth, choosing a topic for self-education, preparing for a future professional certification, studying current trends in educational theory and practice. These directions of mentoring activity are most effectively implemented in small groups, in the conditions of electronic educational environment.

II. RESEARCH METHODOLOGY

The works on this study began in 2014, experimental education was later implemented on the basis of Kemerovo State University. Based on an analysis of the structural and substantive components of the regional education system, it was noted that in basic schools, beginning teachers, university graduates performed the functions of a mentor in relation to older and more experienced colleagues, and the study in other educational institutions gave similar results. Graduates noted a lack of readiness for mentoring activity. This revealed the need to develop technology and provide special conditions for training students for mentoring.

In parallel with the renewal of the main educational programs, work began on the development of technology to train future teachers for mentoring activity which led to the introduction of a new content, forms and methods of learning.

A kind of integrator of all the described learning tools served was the DES Moodle. The appropriate group policy, reporting forms, structure of training elements, etc. focused on the work of students in small groups, with the distribution of role functions, reflexive descriptions, a special system of control and monitoring of learning outcomes were set up for the organization of training.

To solve the set tasks, we had to modernize the existing educational programs, wrapping in them a content, forms and methods of training future teachers for mentoring. Taking into account the specific character of mentoring activity, it seems most reasonable to use the potential of a group of competencies related to the communicative practice of future teachers to include a new learning content, the so-called key communicative competencies formulated in the state educational standard and the professional standard Teacher. The experts involved highlighted the competencies that, in their opinion, are more related to the training of future teachers for mentoring.

The following ones were included in a number of competencies:

- the ability to communicate in oral and written forms in Russian and foreign languages for solving problems of interpersonal and intercultural interaction;
- the ability to work in a team, tolerantly perceive social, cultural and personal differences;
- the willingness to interact with the participants of the educational process;
- the ability to pave the ways for the professional growth and personal enhancement.

As the main form of education, the work in small groups on the implementation of educational projects in the context of DES and electronic information-educational learning environment was used, this form of education not only allowed to solve traditional tasks of vocational training, but also most organically ensured students' readiness for mentoring. Indeed, modern educational organizations need new interactive, ICT-

oriented forms of mentoring, this is the context that should be provided at the university for students.

The project-based learning, elements of distance learning, the use of DES, e-learning, etc. were used as learning methods. The use of working methods in an electronic learning environment is, in our opinion, a necessary condition that ensures the meeting the necessary requirements for a mentor by the professional standard "Educator" as well as in a modern educational organization. After all, the school mentor must not only be a professional in the subject area, but also have the necessary level of information and communication technology and communicative skills to share their experience to colleagues in the educational process.

To perform the project tasks in the Moodle DES, the students were united in small working groups which contributed to the emergence of:

- an ongoing dialogue (discussion) between the group members,
- a demonstration of mentoring qualities of some students in relation to others,
- a more accurate feedback in the learning process,

what is repeatedly mentioned in modern studies of the learning process in small groups [20].

A unique feature of the educational process in which students are united in small groups, is the continuous communication between the participants of the educational project, and this communication is carried out through the communication tools provided by the DES Moodle. It is, above all:

- external tool: communication with other learning systems based on the LTI (Learning Tools Interoperability) data exchange format;

- survey: the opportunity for the teacher to carry out an additional research that may be useful in grading and stimulating learning. The teacher can use a survey to collect student data, learn more about the group being taught in general, and based on this, organize training more effectively;

- wici: the system of collective work with documents, where any registered user can make changes on the page, add comments and additions that will be available to anyone who opens this page after him;

- glossary: an electronic analogue of the special terms handbook (dictionary) can be consistently created by students during the entire period of study;

- seminar: an element for creating social reflection, the teacher gives the topic of the seminar and the rules of participation; the students make reports, and then can grade the reports of all the participants of the seminar on the basis of a system of criteria set by the teacher; the final grade is calculated as the average weighted total of the grades of all the seminar participants: students, an author of the report, teacher;

- forum: the teacher's tool for organizing asynchronous communication of students on specific topics;

- chat: a tool for organizing real-time synchronous communication.

The Russian and foreign authors engaged in training in small groups, note that such a training has the features of a joint learning activity that are provided by a group work [21, 22]. It is:

- a permanent dialogue (discussion) between the group

members,

- a demonstration of mentoring qualities of students,
- a constant communication in the course of work between the group members,
- a development of student teamwork skills,
- a planning of the individual development of students,
- an involvement in the work of some members of the group - by others.

The listed properties of a group work promote the formation of mentoring qualities among future teachers and develop communicative competencies [23].

Taking into account the tasks set by us, the main requirements to the personal qualities of students who took the role of leader in the group were formulated when organizing experimental work on projects in small groups in the DES Moodle: learning activity, a high level of ICT competence, a high level of communication and organizational skills. Obviously, these qualities are necessary not only in the implementation of advisory training activity when working in an educational project, but also in mentoring [24].

When choosing training profiles of future teachers for experimental education, preference was given to:

- various training profiles, both natural science and humanitarian;

- the profiles on which students who have expressed a personal interest in participating in experimental training were trained;

- the profiles, with a problem of different levels of educational achievements of students, including in the field of ICT.

We carried out an expert analysis of 24 educational programs and selected only 8 of them.

When choosing areas of project activity, the educational practice prevailing in the university, the presence of complex projects in the organization of scientific and practical work was taken into account. One of the conditions for the implementation of projects is the possibility of organizing groups of students studying in different areas of training, the mandatory protection of the result of the project or its implementation in practice in school.

For a practical confirmation of the effectiveness of the developed educational technology, we needed to select the required number of projects related to different branches of scientific knowledge, as well as representing all sections of teacher training profiles implemented at the university. An expert analysis of those areas of educational, scientific and practical activities that were common to different training profiles for students was conducted and seven areas were selected. Four - in the framework of the study of subjects, and three - in the framework of the research work of students.

The main stage of the experimental work was carried out for three years; 10 teachers and 379 students took part in the training.

Based on the selected training profiles, small groups of 5-6 people were formed, each of which necessarily included students of the "Computer science" profile for further work.

When organizing work in small groups, we used characteristics taken from materials of various authors [25, 26] and finalized taking into account the specifics of educational programs and traditions of the university (Table 1). The use of

these characteristics allowed us to achieve reproducible results in the formation of mentoring qualities of students in the organization of various educational, scientific and practical projects.

TABLE I. CHARACTERISTICS OF SMALL GROUPS IN THE ORGANIZATION OF TRAINING

Characteristics of a small group	The disclosure of characteristics in the context of experiential training
1. Time boundaries	Coincide with the time of studying the subject or training and the event (from 36 to 108 hours)
2. Physical environment (Physical environment)	A joint project activity is carried out in an information and communication educational environment. The basis forming the educational environment in small groups is the DES Moodle.
3. Group size, a number of members (Group size)	5, 6 people
4. Group composition (Group composition)	Groups are formed according to the principle of a different entry ICT level of participants. In the group, as a rule, there are students with a high humanitarian, but weak technical training, and students with high ICT skills. This group should stimulate the mentoring situation. The presence in the group of a student who is able to explain and demonstrate the work of information technology for the purposes of the project ensures these activity and develops the necessary characteristics.
5. Communication between group members (Communication)	The main means of communication are: chat, forum and teleconference. The participants use cellular communication, e-mail as well as a direct communication between the group members in the process of work
6. Participation (Participation)	The participation of all participants in the group is ensured by common purposes, individual reports of the participants, the position of an informal leader of the group, the pattern of interaction in the group, the conditions of competition in the group and competition between groups. The degree of participation of all students in the work of small groups is monitored by teachers of subjects and a leader of the project.
7. Group cohesiveness (Cohesiveness)	Associated with the formation of a team spirit. Understanding of common purposes, the role of each team member in achieving the purpose. Providing mentoring, mutual assistance, informal relationship
8. Group work norms (Norms)	Formed in the process of work under the control of the teacher or the project leader. The norms are determined by the culture of educational activity of university students, which is formed at all stages of training. The most important requirement is associated with the implementation of the set and accepted individual tasks. When organizing a proper level of independent work on a project, an active leader appears in the group which is the guarantor of compliance with working norms.
9. Procedures (Procedures)	Students perform standard educational, scientific or practical procedures: material search, analysis of the subject area, synthesis of new ideas, calculations, job description, etc.
10. Group structure (Structure)	The roles begin to be defined, the project leader appears already at the first meeting of the group members. The tasks are defined, the degree of readiness of everyone to solve problems is determined. There is an informal communication, groupings in each group. Group structure appeared when the following issues were discussed: planning, division of work, responsibilities in the group, areas of responsibility
11. Group aims (Aims)	The purposes of the group are formed by the participants. The purpose of the group is related to the solution of the task, the personal development of each member of the group, the formation of professional competencies and competencies of work in the group
12. Group tasks (Tasks)	The tasks are formed as a disclosure of the group's purpose. The tasks are a purpose decomposition and are personal. The most convenient option is that one member of the group is responsible for solving the task. The tasks are discussed and adopted at the general meeting of the group. The inclusion of the tasks related to mentoring and training group members is encouraged.

III. RESULTS OF THE RESEARCH

During the experiment, data were obtained that were classified into various categories and characteristics, depending on the original tasks. In the future, the components of the described technology were improved and introduced into educational practice, new sets of statistical data are accumulating. This article presents the learning outcomes for the 2016/17, 2017/18 academic years.

The level of students' readiness for mentoring provided by

using the described technology (in project activity in small groups) proves its effectiveness in comparison with the traditional system of education. The effectiveness of the technology was confirmed by expert reports in the external environment - in schools in practice and at conferences and competitions at various levels.

Besides, a methodology was used to study the group of students' communicative competencies using the rating tools included in the main educational programs to rate the learning

outcomes. The measurements were carried out in parallel with the determination of the level of students' readiness for mentoring activity.

As the distinctive qualities of the person, rated by the project participants, the following were taken: results orientation, desire to help, have a positive impact, ethics, systems thinking, responsibility, self-confidence, optimism,

initiative. Interviews were conducted in addition to the survey. All the project participants were asked to answer questions describing difficult situations in the project and ways out of them.

It is possible to determine the levels of demonstration of mentoring qualities using the rating scale (table 2)

TABLE II. RATING SCALE OF MENTORING ABILITIES OF STUDENTS IN THE CONTROL AND EXPERIMENTAL GROUPS

The scale of the coefficient of mentoring abilities	A share of respondents in control groups in %	A share of respondents in experimental groups in %	The level of demonstration of abilities
From 0.1 to 0.45	45.5	24	low
From 0.46 to 0.55	29	26	below the average
From 0.56 to 0.65	13.5	24	average
From 0.66 to 0.75	8	19	high
From 0.76 to 1	4	7	very high

IV. DISCUSSION

The experiment confirmed our assumption. In some cases, it turned out that the work on the project was most effective when the leader and mentor role was taken by a student with a high level of ICT competencies who actively used computer equipment, taught other group members realizing that individual work would not lead to success. In this case, the maximum mentoring activity in relation to other project participants was noted.

The results of the work were discussed at the department meetings, scientific and methodological seminar, reported at national and international scientific conferences (2016-2018), published in peer-reviewed journals.

V. CONCLUSIONS (INFERENCE)

Experimental educational, scientific and practical activity showed that the use of the considered technology of forming mentoring readiness, based on e-learning, small-group learning and project-based training methods, allowed solving the problem of a different entry level of students training in the field of information and communication technology by activating mentoring.

In the process of work, we determined the conditions for the formation of readiness for mentoring in the conditions of project activity when training in small groups, and an improvement in the quality of students' group work was recorded.

The proposed technology of learning can be reproduced during the training of teachers in other educational institutions.

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