

Training the future teacher-researcher for professional activity at Master's degree level

Preparando al futuro profesor-investigador para actividades profesionales en el master

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ABSTRACT:

In the process of scientific search of the ways of forming and developing research skills of master's students, the aim was to make the process of developing research and creative skills of future masters manageable. The study showed that the development of research skills of master students is carried out more effectively when: using innovative technologies (situational methods, group work, business game, contextual training, etc.); using psychological, pedagogical and diagnostic support of their professional training; forming students' research skills, communicative competence and psycho-diagnostic culture.

Keywords: Innovative Technologies, Teacher-Researcher, Psycho-diagnostic Culture, Communicative Competence.

RESUMEN:

En el proceso de búsqueda científica de formas de formar y desarrollar las habilidades de investigación de los estudiantes graduados, el objetivo era hacer que el desarrollo de la investigación y las habilidades creativas de los futuros maestros sean manejables. El estudio mostró que el desarrollo de las habilidades de investigación de los estudiantes de posgrado se lleva a cabo de manera más eficiente: cuando se utilizan tecnologías innovadoras (métodos situacionales, trabajo en grupo, juegos de negocios, aprendizaje contextual, tecnologías de búsqueda de problemas, etc.); en el proceso de apoyo psicológico, pedagógico y diagnóstico de su formación profesional; Formación de habilidades de investigación de los alumnos, competencia comunicativa y cultura psicodiagnóstica.

Palabras clave: Tecnologías innovadoras, profesor-investigador, cultura psico-diagnóstica, competencia comunicativa.

1. Introduction

Modern requirements for teacher training are generated by the process of modernization of Russian general and higher education. Modernization of education in Russia involves the continuous formation of professional competences of teachers, who are able to solve

complex professional problems, possessing modern educational technologies, focused on continuous self-improvement and innovation. Modernization of the higher professional education system in Russia is associated with the transition to the level of education from the first two levels, bachelor's and master's ones, to the 3rd level, the postgraduate education. In connection with the requirements of the standards of higher education of the new generation, there are currently innovative changes in all areas of higher education: in the organizational structure of the whole educational process, in updating the content of education, in the technologies of training and education, in research work.

In the context of the development of single European education space, the creation of an innovative system of higher education, on the basis of research and implementation of the principles of diversification, profiling, and individualization, the Russian universities joined in a single system of training bachelors and masters. Teams of teachers develop educational and methodical complexes, aimed at creating an innovative educational and developing environment at the University and the organization of independent work of students. In contrast to traditional training, the above-mentioned complexes provide innovative content, methodological and technological support, contributes to improving the quality of training, including the use of information methods, the continuous formation of general cultural and professional competencies of the student, the forecast of its development for the future (Orekhova *et al.*, 2018). In this process, a great role belongs to the teacher, who acts as a professional, creator, generator of new ideas, providing quality training for future teachers, aimed at the formation of a specialist – an active subject of the educational process- capable of carrying out scientific research (Tolochek & Denisova, 2013; Tolochek *et al.*, 2011; Franks *et al.*, 1998; Vance *et al.*, 1988).

Innovative activity of the teacher of higher education contributes to the formation of a teacher with a high professional culture, able to monitor constantly the results of his work, having the ability to analyze pedagogical problems, to formulate hypotheses, apply modern psycho-diagnostic methods, make adequate decisions aimed at overcoming children's problems (Schraw *et al.*, 2000; Kashapov & Poshehonov, 2017).

In this scientific article, we will focus on one of the aspects of innovative activity of teachers of higher education, associated with the development of research skills of future teachers in the process of experimental work and writing a master's thesis.

1.1. Problem review

One of the most important areas of professional training of future undergraduates is research activity, which significantly affects the nature and methods of implementing pedagogical activity of future masters in the process of training in the master's degree, and after its completion. Most undergraduates combine training with professional activities, and this fact is taken into account in the process of organizing the experimental work of a graduate student in the framework of the final qualifying work, that is, a master's thesis. Many undergraduates work in children's educational organizations; several students combine their studies with work in the "Artek International children's center". The base of the research for the undergraduates is their place of work, which allows cooperation with educational organizations, involving in research activities not only students but also their colleagues, which ultimately stimulates the reproduction of teachers-researchers.

At master's courses from the very first studies on the methodology of pedagogical research, students are trained to analyze theoretical sources, generalize, systematize, classify theoretical material; on this basis, they learn to characterize the conceptual apparatus of their research; within the framework of their plan-prospectus of the master's thesis, they present the methodology of their own experiment, etc. Despite the use of innovative technologies, active and interactive teaching methods in the process of training, the majority of scientific supervisors of undergraduates are faced with the fact that the knowledge of undergraduates is not enough to carry out experimental research at the creative level, for a competent solution to the psychological and pedagogical problems posed to them.

Awareness of the need for psychological and pedagogical support of experimental work of undergraduates, and ultimately, the development of their research skills, prompted us to

search for innovative technological methods of such support. Some findings in this area are presented in this article.

2. Methodology

The formation of students' research skills as a subject of research has been considered by us for many years, but our search has become more effective in the management of the master's program "Pedagogy of Higher Education" (since 2013).

Due to this, the main experimental base is the full-time and distance learning magistracy "Pedagogy of Higher Education" of the Ryazan State University named after S.A. Yesenin.

The total number of participants in the experiment is 145 students. In addition, for the implementation of a comparative analysis of research skills in the experimental work, the undergraduate students of the program "Pedagogical Education" (Faculty of Pedagogy and Psychology, Foreign Language Institute, Faculty of History and International Relations, Faculty of Physics and Mathematics) were employed in the amount of 235 people.

Undergraduate students were also included in the pilot experiment for the formation of the psycho-diagnostic culture of the future teacher. The data of this part of the experiment are described in details in the monograph and the articles by O.V. Eremkina (one of the authors (Eremkina, 2006; Eremkina, 2007)).

The experiment for the formation of the psycho-diagnostic culture of the future teacher started in 2000 and has been still continuing. So this year, the results were presented in a collection of scientific papers "Pedagogical experiment: approaches and problems: research papers" (Eremkina, 2019).

In recent years, the implementation of experimental work included not only the authors of the article but also the staff of the Department of Pedagogy and Management in Education of the Ryazan State University named after S.A. Yesenin, Surgut State University, Tyumen Industrial University.

The aim of the study is to create psychological and pedagogical conditions for the effective management of the development process of research and creative skills of future masters, and the result of this search activity is high-quality, competently carried out scientific research.

The object of the research is the professionally personal development of the future master.

Our professional experience and long-term support of professional and personal development of students allowed us to put forward a hypothesis that the development of research skills of master students is carried out more effectively if:

- modern innovative technologies are used for their formation, such as situational methods, group work, business game, contextual training, problem-search technologies, etc.;
- development of research skills of undergraduates is carried out in the process of psychological, pedagogical and diagnostic support of their professional training;
- teachers' activity is based on the essence and the most important characteristics of the scientific psychological and pedagogical experiment.

The methodological framework of the study is based on the fundamental concepts and categories of philosophical doctrines about quality, the theory of knowledge, pedagogical anthropology, about man as a subject, personality, and individuality (Abulhanova-Slavskaya, 1991, Leontiev, 1972, 1983 Rubinstein, 1976, Slastenin, 1997, 2000. As a general scientific methodology are the concepts of the systematic approach and work in the field of methodology of pedagogical research (Abulkhanova-Slavskaya, 1991; Klimov, 2005; Shadrikov, 1996), the theoretical basis of the principle of unity of consciousness and activity (Leontiev, 1983; Rubinstein, 1976) and humanistic and axiological approaches in pedagogical research (Bodalev, 2002; Bondarevskaya, 1999; Leontiev, 1983; Slastenin, 2002).

The theoretical basis of the study is based on the following provisions: the theory of personality formation (Abulkhanova-Slavskaya, 1991; Leontiev, 1972; Rubinstein, 1976; Elkonin, 1994); the concept of teacher personality formation in the system of continuous

pedagogical education (Kuzmina, 1989; Markova, 1993, 1994; Slastenin, 2000).

The selection of diagnostic tools is determined by our understanding of the essence of the psycho-diagnostic culture of a teacher, as it is reflected in the article "Continuous formation of professionalism of the teacher" (Eremkina et al., 2015). «Psycho-diagnostic culture as a substructure of the general professional culture of the teacher is an axiological structure of personality. It determines the direction of the teacher's professional activities on the implementation of psycho-diagnostically support for safe personal development of the child. The current psycho-diagnostic culture stimulates creativity and professional growth of the teacher. Our approach to psycho-diagnostic culture from the perspective of the theory of meaning (Leontiev, 2003) allows us to consider the process of its development as a teacher's finding personal sense in professional and educational activities. This personal sense is found due to the development of internal dynamic conceptual systems in implementing teacher's psycho-diagnostic activity» (Eremkina et al., 2015).

We consider the theoretical model of psycho-diagnostic culture to be a complex psychological multidimensional education in the personality of the teacher. It is characterized as follows: «Theoretical analysis and empirical evidence suggest that psycho-diagnostic culture of the teacher should include motivational-evaluative, reflective-perceptual, cognitive and creative, instrumental and technological components. The determining "nuclear" component of this structure is the motivational-evaluative one» (Eremkina et al., 2015). The components of psychodiagnostic culture serve as its criteria and indicators (Eremkina, 2009).

«The system of work at the university was created and implemented for the formation of a psycho-diagnostic culture of the teacher, which is a set of pedagogical, psychological and organizational activities, aimed at creating and changing relations between the subjects of the pedagogical process. It contains the axiological, psychological and pedagogical, organizational and pedagogical modules, consisting of interconnected components» (Eremkina et al., 2015).

Thus, to study the value attitude to the psycho-diagnostic activity of the teacher, to the diagnostic support of the safe development of the personality, the modified method by M. Rokich (<http://dip-psi.ru/psikhologicheskiye-testy/post/metodika-m-rokicha-tsennostnyye-orientatsii>) "Value Orientations" was used. To study the reflexive-perceptual component of the psycho-diagnostic culture, the method of determining the individual measure of reflexivity by A.V. Karpov (https://studopedia.ru/13_155920_metodika-opredeleniya-individualnoy-meri-refleksivnosti.html) and the test of Michelson's communicative skills (translation and adaptation by Yu.Z. Gilbukh (<http://testoteka.narod.ru/mlo/1/10.html>)) were employed.

One of the features of our search is the psycho-diagnostic support of the professional development of the undergraduates, as we have repeatedly written in the articles (Eremkina et al., 2015; Eremkina et al., 2018). In the process of psycho-diagnostic support of the formation of a future specialist, his psychodiagnostic culture is formed, which we characterize as a substructure of the overall professional and pedagogical culture and the complex psychological education of the teacher's personality. Due to this, the leading method of the research is solving psycho-diagnostic problem tasks, which is not only the main means of forming the psycho-diagnostic culture of the future teacher-researcher, but also allows to measure the progress of the future teacher in the development of his psycho-diagnostic culture and research skills in general.

In addition, in the process of carrying out our scientific research, we have been convinced in the importance of developing the communicative competencies of future masters, which are observed in the ability not only to establish relationships with children but also to feel empathy towards them. Also, different ways of psychological protection of our students were recorded. Thus, express diagnostics of empathy by A. Mehrabian and N. Epstein (<https://hrliga.com/index.php?module=profession&op=view&id=847>; <http://testoteka.narod.ru/mlo/1/10.html>) and the method of studying the dominant strategy of psychological protection in communication by V.V. Boyko (<https://psyttests.org/boyko>) were used. The main results of the study are presented below.

3. Results

The research activity of the student, first of all, requires the formation of research culture in general, and psycho-diagnostic culture in particular. For many years, we have been forming the psycho-diagnostic culture of future masters as a substructure of the general professional culture of the teacher. We consider it to be complex integrative psychological education of the teacher's personality, the core of which is axiological characteristic, which determines the direction of his professional activity on implementing diagnostic support for the safe personal development of the child, stimulating creativity and professional growth of the teacher. In addition, the developed psycho-diagnostic culture contributes to the competent organization of the student psychological and pedagogical experiment and stimulates the development of research skills (Eremkina, 2015).

Psycho-diagnostic culture allows the student to find personal meaning in professional and pedagogical activity, explaining the deep internal processes of forming dynamic conceptual systems in the development of the psycho-diagnostic activity of the teacher (Leontiev, 2014). The most effective technologies of formation of a psycho-diagnostic culture of the future teacher include, first of all, innovative conceptual technological effects, teaching students to solve pedagogical diagnostic problems, work with psycho-diagnostic tables and the implementation of the principle of psycho-diagnostic support in the context of the study of pedagogical disciplines.

The conceptual technological effects include: self-knowledge of the future teacher during the development of diagnostic tools; creating programs for individual personal and professional development of the future teacher; creating a conceptual image of the child's personality as the main value of professional and pedagogical activity; bright characteristic of the "problem" child (failure, conflict, anxiety, with a low level of educational motivation, etc.), understanding of his emotional experiences and the inability to cope with these problems, the actualization of personal problems experienced by students in childhood, showing the possibilities of solving them on the basis of timely diagnosis; reference to the personal pedagogical and diagnostic experience of the teacher (Eremkina, 2006, 2009).

As it was written in methodology, the main method for the formation of psychodiagnostic culture and, in general, the development of students' research skills are solving psycho-diagnostic problem tasks. This is a heuristic search for solving problem pedagogical tasks based on the use of psycho-diagnostics since most pedagogical tasks cannot be fully solved without diagnosing the individual characteristics of children.

Education of students usually begins with the analysis of real pedagogical situations proposed by us or by the students themselves. Using the stages of heuristic analysis in the process of solving pedagogical problem psycho-diagnostic tasks, students learn to single out pedagogical problems, formulate basic pedagogical difficulties, then use the psycho-diagnostic table to further decision on pedagogical measures. The most effective source of sense-making is a visual image of the child's personality, so a variety of pedagogical situations that actualize children's problems is used. The analysis is carried out by means of the case method, contextual learning; in the process of heuristic search of a solution to pedagogical diagnostic tasks; with the help of psycho-diagnostic tables (Anufriev & Kostromina, 2000).

In the process of forming psycho-diagnostic culture, we recorded several stages of its development, described in detail in the dissertation by O.V. Eremkina (Eremkina, 2009). The first stage of the development of psycho-diagnostic culture is characterized by the performance of actions on the model, the ability to reproduce the actions shown by an experienced teacher. Due to this, the first stage was called reproductive adaptive. The identification stage of the development of psycho-diagnostic culture is associated with the process of adopting a new mode of activity of a teacher, that is, activities related to psycho-diagnostic support of the safe personal development of children. The system-reflexive stage is characterized by the complete adoption of a new mode of activity based on psycho-diagnostic support and constant analysis of one's actions (reflection), with the aim of improving it. Finally, the highest stage of development of research skills and psycho-

diagnostic culture is associated with the ability of the student to have a creative attitude to his activity, to carry out creative activity based on analyzing and foreseeing the results of the activity.

In accordance with the stages of development of psycho-diagnostic culture, we established the levels of development of students' value orientations, their reflexive skills and, most importantly, their ability to solve problem psycho-diagnostic tasks. These characteristics correspond to the main components of psycho-diagnostic culture and most accurately characterize the level of its formation in students.

Our experimental work, carried out with students, confirms the effectiveness of the technology for solving psycho-diagnostic problem tasks as the main means of forming a psycho-diagnostic culture. Table 1 presents the results of assessing the level of formation of the psycho-diagnostic culture of future teachers before carrying out special work on the formation of the psycho-diagnostic culture of students and after it. The table presents the measurement results before systematic training for solving psycho-diagnostic problem tasks and after, they are designated as results before the experiment and after the experiment.

Table 1
Dynamics of the psycho-diagnostic culture of master's students after purposeful work on its formation.

The stages of development of a psycho-diagnostic culture of the students	Values and meanings of diagnostic support of safe personal development		The reflective culture		Successful solution of psychodiagnostic problems	
	before the experiment (%)	after the experiment (%)	before the experiment (%)	after the experiment (%)	before the experiment (%)	after the experiment (%)
Reproductive-adaptive stage	25	18	24	11	38	7
Identification stage (meaning formation)	44	27	48	30	25	15
System-reflexive (sense consciousness)	41	30	13	36	20	31
Creative and prognostic stage	-	25	15	23	17	47
	100	100	100	100	100	100

The main indicator of the formation of a psycho-diagnostic culture of students, as it can be seen from the characteristics of the criteria and indicators, is the level of success in solving problem psycho-diagnostic tasks. It should be emphasized that we pay special attention to such important characteristic of the pedagogical experiment as the choice of valid and reliable methods of psycho-diagnostics of the states of the researchable subject and the object before and after the experiment. This is achieved by the study of psycho-diagnostics in the educational process of magistracy, and to a certain extent by psycho-diagnostic support of professional development of the future master. The results of psycho-diagnostic support are available to students, and knowing their own characteristics makes it possible to create individual programs of personal and professional development.

As known, the psychological and pedagogical experiment has several important

characteristics. One of them is a clear formulation of the problem, goals, and objectives of the study, the hypotheses tested in it. In this regard, one of the methods of establishing a logical relationship of the main methodological categories of research is the establishment of horizontal logical connections of the components of the problem, hypothesis, objectives and the intended results of the study, that is, the main provisions to be defended. This technique allows checking the validity of scientific research due to the strict structure of its basic components. At first, students consider the process of such analysis to be difficult, but a clear demonstration of examples, step-by-step development of the essence of methodological concepts on the example of other studies, graduate works of masters, allow to achieve positive results. The implementation of this way of checking the logic of the study is mandatory for each student in the development of the plan-prospectus of the master's thesis. (Eremkina, 2006, 2009).

This method of training is carried out in a similar way to the method of analysis and evaluation of the logic of scientific research carried out by the Higher Attestation Commission of the Russian Federation (HAC RF).

The next important step on the way of teaching students experimental activity is setting criteria and indicators showing if the forming stage of the experiment was successful, and whether the hypotheses of the study were verified. Training starts with giving examples, demonstrating how the process of identifying the essential features of the phenomenon under consideration is carried out. Students learn to carry out an intellectual experiment, to single out the component structure of a subject of the research, the scientific characteristics of the investigated pedagogical category that allows them to formulate criteria of its formation. Indicators, as a specific manifestation of the essence of the qualities of the process or phenomenon, allow not only to specify the criteria but also to choose the diagnostic tools to determine the level of formation of the phenomenon under study (Bodalev, 2002, Kuzmina, 1989, Slastenin, 1997).

The other important characteristic of the pedagogical experiment is the use of consistent and convincing logic of proving the success of the experiment. In our practice of training undergraduates, there are two options for experimental research. In the first option, the implementation of the psychological and pedagogical experiment involves the existence of experimental and control groups and strict monitoring of the formation of criteria and indicators of the phenomenon under study in these groups before and after the experimental work. In the second option allows only one group is necessary but with a large number of subjects. In any case, measurements of the formation of the studied quality are carried out in accordance with strictly prescribed criteria and indicators.

One more important characteristic of the future master, teacher-researcher, is developed communication skills of a young scientist who is able to establish contacts with children, colleagues, and his supervisor. Within the framework of psycho-diagnostic support, monitoring the development of students' communicative competence is done. It should be noted that within the framework of master students' studies we repeatedly collected data on the development of communicative competence of undergraduate students, which are presented in Table 2. They allow fixing a significant difference in the quality of undergraduate and graduate students. This once again points to the influence of innovative technologies used in the formation of a whole professional culture of future teachers and its individual characteristics, to which we refer the developed communicative competence of the future teacher-researcher. Table 2 presents the results of the study of communicative competence before and after special training on communication.

Table 2

Dynamics of communicative competence of undergraduate and graduate students before and after the use of innovative technologies for the development of professional culture.

Stage of training	Developed communication skills		The optimal dominant strategy of psychological protection		Normal level of empathy	
	before the experiment (%)	after the experiment (%)	before the experiment (%)	after the experiment (%)	before the experiment (%)	after the experiment (%)
baccalaureate	65	87	62	85	42	69
magistracy	85	98	78	97	65	78

Source: Own elaboration

The presented data indicate positive dynamics in the development of communicative competence of undergraduate and graduate students. As can be seen, without additional training sessions in the process of studying at the University for almost half of future teachers receiving bachelor's training, such classes are necessary.

4. Conclusions

Implementing our research on psychological and pedagogical support of the development of research skills of students, we are constantly searching for innovative technologies that contribute to the formation of their methodological and psycho-diagnostic culture, the formation of communicative competence of students as a condition of professional and personal development of future masters of pedagogy.

One of the positive results of our research is the growth of activity of students seeking to participate in scientific conferences of teachers and students, the satisfaction of students with the results of their research activities.

At the stage of study at the University, future teachers are included in such an educational system, within which they are given the opportunity to develop their creative abilities. Accordingly, they are included in the innovative project activities, solve problem pedagogical tasks, thereby developing activity, creativity, independence, reflexive skills of the teacher. At the stage of professional activity, the effectiveness of further development of professional culture of teachers is ensured by their inclusion in innovative research activities to solve specific problems of students' development, which actualizes the need for self-improvement of their professional qualities associated with adequate knowledge of students and understanding of the psychological meaning of educational measures.

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