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Development of Research Competence of Future Teachers in The Process of Their Professional Training

Natalia D. Koletvinova* (a), Seimbika U. Bichurina (b)

(a), (b) Kazan Federal University, 420008, Kazan (Russia), 18 Kremlyovskaya street

Abstract

The research is important because of the complexity of the professional training of a creative-minded teacher based on the mastery of the professional research competence. This dictates the need to develop the research abilities of future teachers, whose successful activity implies a multifunctional research character. Psychological and pedagogical conditions for the development of research qualities of students are based on a system of pedagogical actions of intellectual significance in the aspect of individual and personal characteristics. These actions are aimed at creating a scientific and creative educational space using the developed mechanisms for self-activation, self-design, self-determination, self-development and self-study. The purpose of the study is to develop a multifunctional theoretically grounded and practice-oriented paradigm for the development of students' professional research competence and its approbation.

Methods used are theoretical (theoretical analysis of pedagogical, psychological, scientific and methodical literature on the research problem), empirical (analysis, comparison, synthesis, content selection, observation, survey), pedagogical experiment (stating, forming, control stages of the experiment), method of expert assessments, statistical processing of research results. Students with different levels of intellectual, knowledge and professional-oriented qualification study in academic groups of the first course. The multifunctional, structurally informative paradigm for the development of research competence of future teachers was designed.

Keywords: research; competence; integration; interactivity; methodology.

* Corresponding author. Tel.: + 79033444783*; e-mail address*: bichurina@mail.ru

Introduction

The problem of developing research competence is important today because the need of the society for highly qualified specialists increased. Now preference is given to research function of professional activity with which the development of research competence of the teacher providing high-quality training of students is connected. The research works by Mallaev (2014), Moore (2012) are devoted to the problems of the development of research competence. The theoretical foundations of this problem are considered in the works by Andreev (2012), Kodjaspirova (2016).

In the context of professional pedagogical and sociological refraction, research activity is considered in the works of Avdeeva, Andrianova, & Nikulina (2014). The specifics of the development of research abilities are studied by foreign scientists. Their work analyzes the development of individual abilities of students in the course of online academic courses based on self-regulating studies (Cohen & Baruth, 2017), attention is paid to the activation of students' research abilities (Tuisk, 2008).

Mutvei & Mattsson (2014) in their writings explore the criterial importance of students' knowledge through their participation in the process of studying specific phenomena of the surrounding reality. The problem of motivational support for the development of research competence is studied in the work of Makarova (2010). Stavrinova (2008) defines research activities as the acquisition of new science-based knowledge. Its aim is to purposefully change the existing reality. The role of integration factors in the study of research competence is analyzed in the works of Dianov & Denisova (2015), Gorsky (2013).

The problem of designing types of professional activity in the aspect of realizing the creative abilities of students and the development of their research independence is reflected in the works of Bostrom & Sandberg (2009). The development of research activities of cognitive-integration orientation are considered by Koletvinova & Bichurina (2016).

The research paradigm is considered as an integral component of the diverse human life based on the development of new knowledge and its practical implementation (Larin, 2003; Andreev, 2012; Kiseleva, 2016).

Purpose and objectives of the study

Research objectives were to study the necessary scientific-theoretical, scientific-pedagogical, philosophical-educational, scientific-psychological literature on the research problem. Also, we set to theoretically substantiate the problem of creating an appropriate apparatus for developing the research abilities of students in a multidimensional cultural and educational space. In addition, we set to develop technologies, methodological techniques, approaches for the development of research abilities and skills of multi-functional orientation based on the realization of the professional research potential of educational resources for the training of students. Finally, the research was to experimentally test the effectiveness of vocational-oriented teaching for research skills by the developed method, to summarize the results of the experiment.

Literature review

The initial basis for the development of the problem of research abilities is reflected in the works of Korovina & Zabolotnaya (2018). They devoted to the study of orienting-research reflexes. They revealed the essence and significance of the orienting- research reflex in the life of man and of animal. Korovina & Zabolotnaya (2018) dedicated their works to the analysis of the features of the reflexive stage. They note that the reflexive stage of development of students' research skills implies an awareness of the

actions performed, the identification of risks and errors, the correlation of the results with the planned output.

Nefedova & Ukhova (2016) notes that the formation of research competencies requires a systematic and directional implementation of the methodology for the formation of students' research qualities. It is connected with an increase in the level of intellectual, creative, and logical-heuristic functions of cognition. According to Korshunova & Nan (2017) research activity is an absolutely independent study of educational material. The solution by students of individual problems, creative and research tasks by various means in conditions of joint activity of a teacher and a student is analyzed. Spirin (2008) considers research activities in the aspect of applying the competence-based approach in designing teacher training on the basis of mastering the research skills that are necessary for them in their professional activities.

Recently, studies of foreign and Russian scientists about the activation of the use of scientific knowledge and the development of research skills on the basis of dialogized communication, taking into account the personified qualities of students, were developed (Roman, A.F. & Roman, R.M., 2014; Canaleta, Vernet, Vicent, & Montero, 2014; Isidori, 2015; Fomina & Mityaeva, 2016). Many scientists consider research as mega-activity, which creates conditions for the realization of the personality in all its manifestations.

Thus, research competence can be defined as a set of theoretical knowledge, allowing to derive new knowledge about the subject of research based on independent study of scientific and educational material and possession of the necessary and sufficient competence components of research activities in terms of the requirements of modern education.

Methodology

A system-forming complex of interconnected and interacting content-procedural means of ensuring the effectiveness of the development of professional multifunctional research competence was used to test the hypothesis: theoretical - analysis of multidirectional scientific literature on psychological, pedagogical, sociological, cultural studies; analysis of educational and methodical literature; theoretical analysis of the main provisions of the proposed methodology, on the basis of which the research hypothesis was advanced; theoretical substantiation of the system of professionally-oriented work with students on the development of research competence; empirical – included observation, stating and forming pedagogical experiment, questioning, testing, analysis of the experimental work results.

The research was conducted among first-year students of the Institute of Psychology and Education, Kazan (Volga Region) Federal University. The experiment involved 80 people.

The research was conducted in two stages. At the first stage the process of developing professional research competence on the basis of the development of students' research abilities was monitored; student survey; determination of the level of formation of professional research components was carried out; the approbation of the research topic at the initial stage of the ascertaining experiment was conducted. At the second stage the theoretical concept of the study was specified and corrected; a mass learning experiment was conducted; analysis, synthesis and systematization of the data; research design; the approbation of the research topic in publications and speeches of authors at scientific conferences was carried out.

The study developed specific evaluation criteria for determining the level of mastery of the main components of professional research competence: scale of preliminary competence-research orientation;

methodology of typology of educational research; research methodology of awareness of the integrity of the interaction and the relationship between the development of research abilities and research potential of educational resources; methodology of research integration in professional activities.

Results

The ascertaining stage of the experiment was conducted with first-year students (80 participants) in September 2017. The purpose of the stage was to carry out diagnostics of a preliminary integration orientation. Students of the control group consisted of 20 participants. Students of the experimental group were 60 participants. The students of both groups were given questions from the test of research orientation in order to determine the degree of interest in the problem of research, the level of knowledge on the topic and the ability to apply research skills in their professional activities. The diagnosis of the proposed answers scored:

1. It is difficult for me to use research components in the proposed texts.

2. I have difficulty in finding the research principles in the text, in carrying out the differentiation of research skills in the text.

3. Obtaining new knowledge based on research competence is difficult.

4. It is difficult for me to choose educational material of research orientation.

5. I feel uncertainty about the definition of research activities and their role in the systematization of knowledge.

6. Competence-research construction of classes causes serious difficulties.

The level of general research qualification in selected groups at the stage of ascertaining experiment

levels	Experimental group		Control group	
	quantity	%	quantity	%
High	3	5	1	10
Medium	27	45	9	40
Low	30	50	10	50

The formative stage of the experiment was conducted in the experimental group (60 participants) during September 2017 – May 2018.

The purpose of the formative stage of the experiment is to develop research competence of first-year students and to work out the teaching methods and means for the development of multifunctional research competence in the vocational educational environment.

For the development of research competence of students the following methodological guidelines were used: 1. Practice-oriented systematic multidimensional cognitive activity with students, aimed at mastering the necessary and sufficient components of research professional activity. 2. Research technology of professional and personal orientation. 3. Pedagogy and psychology in the context of the integration interaction of deducing the potential for the development of multifunctional research competence. 4. Pedagogy of professional and research support of students, focused on creative, intellectual productive activity. 5. The method of self-activation and research self-realization based on cognitive-

integration intensification and systematization of the gained knowledge. 6. The method of motivational orientation and individual interest. 7. Method of situational conditionality and communicative event. 8. Conducting specialized types of research activities based on integration and interactive interaction.

The control stage of the experiment was conducted in May 2018. The purpose of this stage was to diagnose the fluency in types of research activity of first-year students.

Table 1. Research methodology of professional research orientation. Level of research orientation

Levels	Experimental group		Control group	
	quantity	%	quantity	%
High	30	50	2	10
Medium	27	49,5	12	60
Low	3	0,5	6	30

Research typology	Experimental group						Control group					
	Levels						Levels					
	high		medium		low		high		medium		low	
	eople		eople		eople		eople		eople		eople	
Basic research	0	0	9	8,3		,7		5	2	0		5
Conceptual study	6	3,3	2	3,3		,3		0		0	2	0
Theoretical research	0	0	9	8,3		,7		5	1	5		0
Professional research	8	6,6	1	1,7		,7			5	5		0
Case study	6	0	4	0				0	2	0		0

Table 2. Research methodology of educational research typology. Level of educational research typology

In general, students of the experimental group in all indicators presented a higher level of proficiency in educational research typologies than students of the control group. In the experimental group 49.98% and 48.32% of the students under study have a high and medium level. In the control group the results are different: for all indicators a lower level was presented.

Awareness	Experimental group	Control group
	Levels	Levels

	high		medium		low		high		medium		low	
	eople		eople		eople		eople		eople		eople	
Reasonable	0	0	9	8,3		,7		5	2	0		5
Creative and productive	0	6,7	9	1,6		,7		0	0	0		0
Professional and personal	8	6,6	1	1,6		,7			7	5		0
Individual		3,3	2	0	0	6,7		0		0		0

Table 3. Research methodology of the level of students' awareness of the expediency of using research competence in various types of professional activity. The level of awareness of the expediency of using research competence

A study of the level of awareness of the expediency of using research competence showed significant differences between groups. In the experimental group low and medium levels in all indicators have lower values than in the control group.

Levels	Experimental group			Control group		
	quantity		%	quantity		%
High	25		41,7	3		15
Medium	35		58,3	10		50
Low	0		0	7		35

Table 4. Research methodology of professional research competence-integration interactivity. Level of research competence and integration interactivity

Analysis of the results showed that 41.7% and 58.3% in the experimental group had a high and medium level of professional research competence of integration interactive orientation. In the control group: 15% of students have high level; 50% of students have the average level and 35% - a low level of formation of professional research competence.

Awareness	Experimental group						Control group					
	Levels						Levels					
	high		medium		low		high		medium		low	
	eople		eople		eople		eople		eople		eople	
Integration research components	0	0	9	8,3		,7		5	4	0		5
Interactive research components	8	6,6	1	1,7		,7			7	5		0

Cognitive research components	8	3,3	2	6,7				0	3	5		5

Table 5. Research methodology of development of competence-research components of a multi-level nature. Level of research competence in groups

Analysis of the results showed that in the experimental group 53.9% and 46.7% have high and medium levels of research competence. In the control group 10% have a high level, 73.3% have an average, and 16.6 have shown a low level, which may be due to different methods of teaching disciplines.

This testifies the effectiveness of the worked out means of developing research competence of a multi-level focus, contributing to the expansion of scientific and theoretical horizons, independent thinking and raising the level of professional training of students in the aspect of finding non-standard solutions to problems of scientific and educational issues.

According to the results of the study, the experimental group showed a higher level of research competence compared to students in the control group.

The most effective way to develop the research competence of students is to select the optimal paradigm of vocational training in the context of self-improvement of intellectual abilities and cognitive activity. An effective way to develop research competence also includes the creation of a multidimensional research educational space with the development of necessary and sufficient resources and components that meet the needs of modern education. It was found that this level of professional training contributes to the development of a specialist of an innovative formation with a creative type of thinking, who can independently make decisions based on the prediction of their consequences, and who actively participates in the positive transformation of the life activity of society.

Discussions

Shirobokova (2011) considers the specifics of organization and conducting of students' research activities in the context of their multidimensionality. The author emphasizes the importance of research activities for the learning process. The study by Berezhnova & Krayevsky (2010) presents the basics of teaching and research activities, their importance in the learning process. Lebedev (2010) analyzes in detail the research competence of the teacher. Attention is paid to the specifics of the research activity of a teacher. The scientist considers specialized means of forming competence. A deep, versatile analysis of research activities is presented in the work of Zagvyazinsky (2010). The work of Platonov (2016) is devoted to the features of research work in educational institutions. The author examines the principles of conducting research work in institutions. He provides recommendations on the publication of the results of scientific research with the elements of a mathematical model for identifying the scientific potential.

Foreign scientists consider the research paradigm of education in a variety of research aspects. These aspects are directed on obtaining new knowledge that can transform the surrounding reality. The priority role in the development of research competence is given to the processes of creativity and self-education.

Cunningham (2010), Hsu, Hamilton & Wang (2015), Virtanen devoted their works to the interrelations and interdependencies of multidirectional knowledge, the creation of new knowledge on this basis.

Research in the context of motivational conditionality and the corresponding target orientation is reflected in the works of Meyer, Haywood, Sachdev & Faraday (2008).

Interactivity as an opportunity to develop research capabilities based on situational integration, the potential for integrating the educational process is explored in the works of Bukatov (2017).

However, a comprehensive solution of the problem of the multi-functional research competence development in the cultural and educational space is not observed. The classification of research components of a professional orientation is not considered. The research potential of educational resources for students' training in the context of obtaining new knowledge and new experience is not analyzed. The specificity of vocational speech support of different-level research activities is not presented.

Conclusion

The study showed that the development of research competence of students depends on many factors. They include the development of professionally-oriented activities, the choice of methods of motivational and intellectual activation, and the development of a special model of its development. A systematic, phased work with them in the process of practice-oriented learning is considered.

In the course of the work, the effectiveness of the chosen approaches and methods of research training of students was confirmed. A high level of mastery of research competence-relevant components, the success of their application is emphasized.

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