

Vocational training of school teachers in Yakutia's universities through the principle of regionalization (case study of the methodology of teaching natural science to prospective teachers)

La formación profesional de profesores de escuela en las universidades de Yakutia a través del principio de regionalización (estudio de caso de la metodología de enseñanza de ciencias naturales para futuros profesores)

Elizaveta Afanasyevna BARAKHSANOVA [1](#); Elena Zotikovna VLASOVA [2](#); Vera Alekseevna VARLAMOVA [3](#); E. V. NIKITINA [4](#); Mikhail Semenovich PROKOPYEV [5](#); Anastasiya Nikitichna MYREEVA [6](#)

Received: 01/02/2018 • Approved: 15/03/2018

Contents

- [1. Introduction](#)
 - [2. Literature review](#)
 - [3. Materials and methods](#)
 - [4. Results](#)
 - [5. Discussion](#)
 - [6. Conclusion](#)
- [Acknowledgements](#)
- [Bibliographic references](#)

ABSTRACT:

The relevance stems from the challenges associated with training prospective school teachers. Russia has a need for the regionalization of educational system due to the transition from a unified training scheme to a new national-regional system. The effectiveness of the proposed methodology of teaching prospective Yakutia schools teachers in the conditions of bilingualism was confirmed by the results of its implementation which demonstrated a higher level of professional and communicative skills of students in

RESUMEN:

La relevancia proviene de los desafíos asociados con la formación de futuros profesores de escuela. Rusia tiene una necesidad de regionalización del sistema educativo debido a la transición de un esquema de capacitación unificado a un nuevo sistema nacional-regional. La efectividad de la metodología propuesta para enseñar a los futuros maestros de las escuelas de Yakutia en las condiciones del bilingüismo fue confirmada por los resultados de su implementación, que demostraron un mayor nivel de habilidades

mathematics, physics, computer science and chemistry.

Keywords: university training of prospective teachers, natural science and mathematics, the principle of regionalization, teaching methods

profesionales y comunicativas de los estudiantes en matemáticas, física, computación y química.

Palabras clave: formación universitaria de futuros profesores, ciencias naturales y matemáticas, el principio de regionalización, métodos de enseñanza

1. Introduction

National educational policy of the Russian Federation is aimed at creating optimal conditions for the ethno-sociocultural development of prospective school teachers in Russia's educational institutions and aims to meet the ethno-cultural educational needs of the indigenous peoples of the North and create conditions that ensure self-identification of prospective school teachers. One of the main practical tasks is to improve vocational training in natural science and mathematics obtained by prospective teachers working within general education programs with ethnic (national-regional) component when the instruction is carried out in native (Yakut) and non-native (Russian) languages.

In this regard, the principle of regionalization should be seen as a compulsory educational strategy of the region when teaching mathematics, physics, and computer science to prospective school teachers in the Republic of Sakha (Yakutia), as such instruction aims at educating a citizen, a patriot, and a responsible person and enables to fulfill personal aspirations of a person in accord with the socio-economic conditions of the place of residence.

Researchers N.K. Akhtayeva, B.D. Zhumakaeva, B. Sagyndykuly, G. Sagnaeva, G. Bayaliyeva, (2017) highlight the importance of language instruction in teacher training. In addition to that, M.D. Brooks (2017) notes that the study of the problem of bilingualism is important for the vocational training of teachers. Ethnic components of educational programs reflect the peculiarities of language, the national way of life, ethnopsychology and national mentality, as they create the environment where the personality is formed and developed. S. García-Mateus and D. Palmer (2017) consider the linguistic pedagogy as an important factor of positive self-identification in bilingual education.

Having analyzed the works of N.K. Akhtayeva, B.D. Zhumakaeva, B. Sagyndykuly, G. Sagnaeva, G. Bayaliyeva (2017) and M.D. Brooks (2017), we can state that the vocational training of prospective school teachers should take into account ethnic and linguistic characteristics and should include such approaches that reflect the specifics of the environment, lifestyle, national culture, etc. In the course of this study, we set the following goal: to identify, theoretically substantiate and to test ways the principle of regionalization may be implemented in education when teaching natural science and mathematics to university students.

It should be noted that when choosing teaching modes and methods for teaching natural science and mathematics at a general education school, it is necessary to consider the specifics of rural schools.

2. Literature review

The state educational policy dealing with the issues of the aboriginal peoples is called "culture-based education" (CBE) – education/upbringing on the basis of culture. Preservation of the native language of the ethnic community and using it in the learning process are an important part of the CBE. Schools aim to pass knowledge in students' native language. However, not all tribes have a written form of their native language. In general, schools working according to the CBE programs can be divided into three groups: general ones that educate students but do not account for their multicultural or ethnic composition; multicultural ones that meet cultural as well as academic needs of different racial or ethnic groups of students; and the cultural-specific which meet the needs of a particular cultural or ethnic group of students.

U.A Vinokurova (2015) notes that cultural education includes the native language and important elements of the native culture.

Having studied and evaluated cultural-oriented educational programs for American Indians in the United States, David Beaulieu (2006) concluded that learning is an activity with social content, a sociolinguistic and semiotic network of stories and relationships. Among its goals, school should include the values of the community that are necessary for the continuation of socialization and the upbringing of children in a changing world. However, most of the curricula of Native American schools have the insufficient ethno-cultural basis.

Soenke Biermann from Australia suggests revising the existing models of teaching and learning since, as he notes, many students, especially among vulnerable groups, demonstrate a growing opposition, apathy and alienation from the education system (Biermann, 2008).

Bilingualism in the system of school education in Yakutia and the specifics in the regional educational system necessitate the cooperation of school teachers, and one should develop the whole bilingual complex, i.e. the holistic picture of studying subjects in two languages simultaneously. It is necessary to develop appropriate methodology for teaching subjects in conditions of bilingualism which reflects the specifics of such schools, and propose ways of increasing the level of school education in these conditions using the principle of regionalization.

First, it is necessary to take into account the culturological and educational opportunities provided by the educational environment of the school and the place of residence so that students can see the meaning of their studying, activities, as well as the personal importance of everything that happens as they interact with nature, society, culture.

Second, one should help students form the image of the geocultural space which is the result of self-identification of the individual in the socio-cultural environment he lives in, the place where he operates and is aware of the meanings and values of his own existence in the certain area, the relationship between a growing person and the society, the sense of belonging to the life of the region, understanding and increasing the knowledge of culture as a historically set system of ideals and behavioral skills (Fiklistova, 2008).

The importance of the national and regional component in general education is considered in the studies of E.A. Barakhsanova, V.A. Varlamova (2015), A.V. Ivanova, A.P. Ivanova (2016), A.V. Mordovskaya (2010), O.O Fiklistova (2008), T.A Shergina (2016), M. P. Lapchik, A.K. Taryma (2012) published in Russian scientific journals.

We understand the principle of regionalization as the implementation of state and regional educational policies with maximum consideration of local socio-economic conditions, cultural and historical traditions, and students' individual learning needs. This study represents an attempt of training prospective teachers using the principle of regionalization, which should account for the specifics of the Russian regions.

In his thesis (2015), M.S. Prokopiev notes that when developing a comprehensive system of methods for teaching in natural science and mathematics it is necessary to include approaches that take into account the specifics of regional education systems.

In our work we used the findings of the research exploring the issues of rural schools and conducted under the supervision of Professor N.D Neustroev (2015) which presented the data on the linguistic diversity of the Yakut, Evenk, Yukagir and Even language groups. It should be noted that the socio-cultural basis of Russian identity is the language competence, and this issue must be taken into account in the course of the vocational training of school teachers speaking several languages.

The global development of bilingual education is determined by general trends of integration, dialogue of cultures and wider intercultural communication. We believe that the methodologically viable combination of languages of the instruction is the crucial component of the principle of regionalization.

3. Materials and methods

The pedagogical experiment was conducted in the Teacher Training Institute of the North-Eastern Federal University (NEFU). Over 500 students participated in the experiment, of

which 100 students majoring in Informatics and Computer Engineering (ICE), 200 students of Primary Education (PE), 120 students of Pre-school Education (PSE), 100 students of Technology (Handicraft); all these students were in their 1-4 year of study, doing a full-time course, which according to the state educational standard of the Russian Federation implies studying such subjects as mathematics, computer science, physics and chemistry. We examined the abovementioned subjects in order to determine how the graduates of the Teacher Training Institute teach natural science and mathematics in schools and kindergartens of Yakutia.

In line with the goal set, we identified the tasks that were to be solved during the experiment:

To identify the initial level of the basic knowledge of mathematics, computer science, physics and chemistry prospective teachers possess.

We conducted a survey and a questionnaire (the survey implied the respondents' consent to take part in the experiment; the questionnaire was carried out to assess the role and importance of regionalization of education as an important component of teacher's work in the region).

The experiment also involved gradual introduction of additional subjects and methods of instruction into the curriculum of prospective school teachers trained in a regional university, which was to be done according to the developed indicators and criteria to assess the formation of certain aspects of professional competence in conditions of bilingualism.

Tasks 1 and 2 were to be implemented during the first stage of the experiment – the ascertaining one. Task 3 was solved during a lengthy searching and the final stage of the experiment. At the ascertaining stage of the experiment we conducted a test to measure the initial level of the basic knowledge in the field of natural science and mathematics of the NEFU students majoring in education. In addition to that, we conducted a questionnaire among the fourth year students to assess the role and importance of information competence in their vocational activities. The main purpose of the experiment was to identify the initial level of basic knowledge of natural science and mathematics of prospective teachers, as well as to assess their attitude to information competence as an important component of vocational training of teachers in rural schools.

To assess the readiness of the first-year students majoring in education to mastering the university course of natural science and mathematics after enrolling at university, we conducted the placement test to measure their knowledge of these subjects obtained at secondary school. In this test, students were given 15 tasks with three levels of difficulty. Of these, 9 tasks were of the beginner level (A), 5 tasks of the basic level (B), and 1 task of the advanced level (C). The test lasted for 60 minutes. Accomplishing each assignment, a student could score from 0.5 to 1.5 points, depending on the level of difficulty of the questions, with the total score of 10 points. The following scale of assessment was used: high level – 8-10 points, average level – 5-7 points, low level – below 4 points. According to the test results, the first year students demonstrated the insufficient level of knowledge in the school course of computer science. The data obtained proved that the initial provisions of the study were correct and there is a need for alternated use of the two languages – Russian and Yakut, – to increase the level of students majoring in education who did not obtain sufficient knowledge in the school computer science course.

To solve the relevant tasks of the ascertaining experiment, we used specially developed questionnaires to reveal how various groups of the students assess the role and significance of the information competence a prospective teacher should possess.

The questionnaires aimed at evaluating the following basic indicators of students' readiness to use information and communication technologies in their future professional activities: self-assessment of their own level of computer skills; self-assessment of knowing the methods of applying ICT in teaching non-native (Russian) and native (Yakut) language; awareness of the importance and need for mastering information competence as an indispensable component of the professional competence of prospective teachers.

4. Results

Having analyzed the results of the initial survey among students of the Teacher Training Institute which aimed to identify the self-assessment, as well as the role and importance of information competence as an important component of the teacher's vocational training, we could draw the following conclusions. Almost half (47.33% of the respondents interviewed) worked with children in rural school, but only 28.67% of them use ICT when teaching natural science and mathematics. About 75.67% of the respondents estimated their level of ICT competence in teaching Russian and native (Yakut) languages as low, but the main obstacle they had to face when using ICT in teaching these two languages, in their opinion, is associated with linguistic programs, as well as special and bilingual terminology. At the same time, only 67.67% understand the importance of using ICT in future work and the need to upgrade professional ICT skills.

Thus, the data obtained prove that: the system of vocational training of school teachers does not comply with the requirements of the modern school, and this is the main explanation of the low level of IT competence of school teachers of different subjects. There is a lack of methodological aids and didactic materials reflecting the national specifics of students mastering bilingual terminology.

The methodology aimed at the formation of students' appreciation of their place of residence enables to solve the problems related to learning in the conditions of bilingualism. Positive values regarding the language of communication (native – Yakut, non-native – Russian) are acquired through the implementation of the principle of regionalization. They integrate into the values of an individual and become the core of teacher training in the regional education system.

We share the opinion of the eminent practicing teachers that it is necessary to develop a new approach that combines the content (its invariant and variative aspects) and procedure (activities) of learning. The improvement of education in the national region should be achieved not by changing the requirements posed by the society, but one should improve the connection between general and specific aspects, which would allow increasing the educational, learning and developing potential of the subject through the content of the variable part of educational programs. This means that along with basic programs that are the same for the whole country, it is necessary to create regional educational programs. The latter would require a different approach to the formulation of teaching and educational tasks, as well as the development of natural science and mathematics curricula. The invariant part, aimed at familiarizing students with general cultural and nationally significant values, as well as the formation of personal qualities, can not be fully implemented until the variable program which reflects regional aspects is developed.

It was necessary to find out on which subjects students can learn about the specifics of the educational institutions of Yakutia; for this purpose we conducted a questionnaire among the first year full-time students majoring in education. The analysis of the questionnaires showed that many students (45%) believe that they received information about Yakutia only at school lessons of geography; 29% of students named lessons of humanities, and 26% could not answer the question.

The principle of regionalization of education when studying natural science and mathematics will allow prospective teachers to feel real pride for their place of residence, and be willing to return and work at the place of their birth. For instance, 79% of students feel pride when they hear on the radio, see on TV, or read in the newspapers about Yakutia, their native land. In this regard, we analyzed the educational and methodological support of the regional component of the Republic of Sakha (Yakutia), the requirements of the state educational standard, and the national-regional component in education.

5. Discussion

In our opinion, the data obtained through the questionnaire among students about the importance of implementing the principle of regionalization in the vocational training of

prospective teachers in rural schools can be seen as the result of improving the quality of education in general schools in the North-East of Russia.

Out of 500 respondents, 76% expressed their positive attitude to the implementation of the principle of regionalization. In our opinion, primary education students showed the greatest understanding of the issue (75% of the respondents came from rural areas of Yakutia) and students of pre-school education – 82% of students were from Yakutia regions where a large number of students are familiar with the problems of local rural schools. On the other hand, students coming from cities and district centers are not familiar with this problem and had difficulty answering the question (11%).

During the experiment, 82% of students changed their opinion of their place of residence in a positive way, and 55% of the boys plan to return to Yakutia for further work after the army, graduation from universities and other educational institutions.

The delicate and unobtrusive emphasis in school teachers vocational training on the intrinsic value of their geocultural space, the use of different forms, methods and techniques of organizing joint activities for the formation of the professional competence allowed students to independently analyze, compare, summarize, and draw conclusions, with regard to the specific features of the regional general education. It can be stated that 65% of students have a high level of training in natural science in the conditions of bilingual education in general schools in Yakutia.

It was important for us to explore the socio-cultural aspect of rural schools development in order to understand, firstly, how the principle of regionalization as a means of preserving and replicating ethno-cultural traditions will contribute to the operation and development of a modern rural school; secondly, vocational training in educational activities of the rural school is historically conditioned and satisfies the needs of all parties of the learning process.

Scientific research, initiated and carried out by indigenous scientists on Indigenous Methodology, is conducted in Norway, Finland, Canada, Australia, and African countries. In Yakutia, the foundations of Indigenous Methodology were laid by I.A. Argunov who created a sector of complex sociological research at an academic institute and substantiated the significance and native values of the peoples of Yakutia during the period when the Soviet state was transforming social relations [3].

In this regard, a number of issues related the linguistic theory and raised in a recent article by Y. Ritzau "Polylinguaging, integrational linguistics and contemporary sociolinguistic theory: a commentary on" [22] are of significant interest. Besides, there is a study by J. Elen "Educating digitally competent teachers: A study of integration of professional digital competence in teacher education" [23] which focuses on the integration of professional digital competence into the initial teacher training programs in Norway. The research shows that there are weak correlations between positive management, support of leadership development and digital competence of teachers, but there are stronger positive correlations between the effectiveness and competence of teacher training staff.

The principle of regionalization of education will make it possible to create a single context and common goals for many regional projects and authors' original programs aimed at in-depth study of academic subjects, which would take into account the specifics of learning in rural schools in Russian regions, as well as it would improve the mechanism for managing the regional education system in Yakutia and the selection of the variable content of the national-regional component by educational institutions.

Thus, the implementation of the principle of regionalization in teaching natural science and mathematics in a general education school is the most efficient way to develop bilingual education in Russian regions.

6. Conclusion

At present moment, the application of the principle of regionalization plays a significant role in the vocational training of prospective teachers in the regional education system of the North-East of Russia.

The authors reveal the necessity and potential of preserving the native language of communication when teaching natural science and mathematics, taking into account the specifics of the region and the educational environment in schools and universities of Yakutia, which enables a teacher to choose and take balanced decisions by providing alternative and independent range of forms and methods of instruction that are based on the principles of regionalization of education.

Acknowledgements

The article is published within the project of the Government of the Russian Federation No. 27.8935.201/БЧ.

Bibliographic references

- AKHTAYEVA, N.K., ZHUMAKAEVA, B.D., SAGYNDYKULY, B., SAGNAEVA, G., BAYALIYEVA, G. Competency-based approach in modern language education. *Man in India*. Vol 97, year 2017, number 3, page 333-340.
- ARESTOVA, V.J. The establishment and development of rural schools in Russia (19th-21st centuries). *An ethnocultural perspective Terra Sebus*. Year 2014, page 31-44.
- ARGUNOV, I.A. Social development of the Yakut people. Novosibirsk, Nauka.
- BARAKHSANOVA, E.A., VARLAMOVA, V.A. Teaching and methodological support of the implementation of the principle of regionalization of education in the process of teaching IT subjects. *Modern problems of science and education*. Number 5, year 2015. Retrieved from: <http://www.science-education.ru/128-22282>
- BROOKS, M.D. How and When Did You Learn Your Languages? *Bilingual Students' Linguistic Experiences and Literacy Instruction Journal of Adolescent and Adult Literacy*. Vol 60, year 2017, number 4, page 383-393.
- CONTEH, J. Opening doors to success in multilingual classrooms: Bilingualism, code switching and the professional identities of ethnic minority primary teachers. *Language and Education*. Vol 21, year 2007, number 6, page 457-472.
- FAKHRUTDINOVA, G.Z. Ethno-pedagogical factor of polycultural training. *International Journal of Environmental and Science Education*. Vol 11, year 2016, number 6, page 1185-1193.
- FIKLISTOVA, O.O. Realization of the principle of regionalization of education in secondary school (on the example of geography). *Thesis of the Candidate of Pedagogical Sciences*. Yakutsk, 2008.
- GARCÍA-MATEUS, S., PALMER, D. Translanguaging Pedagogies for Positive Identities in Two-Way Dual Language. *Bilingual Education Journal of Language, Identity and Education*. Vol 16, year 2017, number 4, page 245-255.
- IVANOVA, A.V. Theoretical bases of regionalization of mathematical education: Ways of the updating of modern education. Materials of the All-Russian scientific-practical conference devoted to the 80th anniversary of Corresponding Member of the Russian Academy of Education, Doctor of Pedagogical Sciences, Professor Dmitry Alekseevich Danilov. Ed. by A.I. Golikov, I.I. Portnyagin, V.V. Nakhodkin, S.V. Panina, M.A. Mestnikova, year 2015, page 99-101.
- KALIYEVA, E.I. Formation of research competence of future educators against the background of ethnocultural space. *Middle East Journal of Scientific Research*. Vol 17, year 2013, number 1, page 11-15.
- KLARA, K., BAKTIYAR, O., SANDYGUL, K., RAIKHAN, U., GULZHIYAN, J. Ethnic pedagogy as an integrative, developing branch of pedagogy. *Mediterranean Journal of Social Sciences*. Vol 6, year 2015, number 1S1, page 612-619.
- LAPCHIK, M.P., TARYMA, A.K. Theoretical Foundations of Forming ICT Competence of Future Teachers of Tuvan Language in the Conditions of Bilingualism. *The world of science, culture,*

education. Vol 32, year 2012, number 1, page 136-140.

MORDOVSKAYA, A.V. Pedagogical aspects of improving regional education: Monograph. Education and Science of the Russian Federation, FGAOU HPE M.K. Ammosov North-East Federal University, Teacher Training Institute. Moscow, MGOU Publishing house, year 2010.

NEUSTROEV, N.D., NEUSTROEVA, A.N. Ethnoregional traditions in the education and education of rural youth. Humanitarian education as an imperative for the development of civil society. Collection of scientific and methodological materials of the international scientific and educational forum of NEFU. Year 2014, page 550-560.

NIKOLAEVA, A.D. Model of teaching native (Yakut) language in the bilingual educational process, taking into account the formation of meta-subject skills in students. *Philological Sciences. Theoretical and Practical Issues*. Vol 32, year 2014, number 2, page 155-161.

PROKOPIEV, M.S. Methods of teaching the discipline "ICT in Education" for future teachers on the basis of modular inter-subject integration. Thesis of the Candidate of Pedagogical Sciences. Krasnoyarsk, 2015.

SHERGINA, T.A. Pedagogical conditions for the modernization of the educational process of rural small-school (on the example of the Republic of Sakha (Yakutia)) Thesis of the Candidate of Pedagogical Sciences. Yakutsk, year 2016.

VAN VIEGEN STILLE, S., BETHKE, R., BRADLEY-BROWN, J., GIBERSON, J., HALL, G. Broadening educational practice to include translanguaging: An outcome of educator inquiry into multilingual students' learning needs. *Canadian Modern Language Review*. Vol 72, year 2016, number 4, page 480-503.

VINOKUROVA, U.A. Ethnocultural education in the Far Eastern Federal District of the Russian Federation. Collective monograph. Ethnocultural Education Series, year 2015, number 1.

WILLENBERG, I. Working with bilingual learners: An introduction. *English in Australia*. Vol 50, year 2015, number 1, page 86-96.

ORMAN, Jon, PABLÉ, Adrian. Polylanguaging, integrational linguistics and contemporary sociolinguistic theory: a commentary on Ritzau. *International Journal of Bilingual Education and Bilingualism*. Vol 19, year 2016, number 5, page 592-602.

INSTEFJPRD, Elen J., MUNTHE, Elaine. Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education*. Vol 67, year 2017, page 37-45.

BEAULIEU, D.A. Survey and Assessment of Culturally Based Education Programs for Native American Students in the United States. *Journal of American Indian Education*. Vol 45, year 2006, number 2, page 50-61.

BIERMANN, Soenke. Indigenous Pedagogies and Environmental Education: Starting a conversation. *International Journal of Pedagogies and Learning*. Vol 4, year 2008, number 3, page 27-38.

1. Doctor of Pedagogical Sciences, Professor, Head of the Department of Informatics and Computer Engineering, North-Eastern Federal University named after M.K. Ammosova, Yakutsk, elizafan@rambler.ru

2. Doctor of Pedagogical Sciences, Professor, Head of the Department of Computer Technologies and E-Learning, Russian State University named after A.I. Herzen, St. Petersburg, vlasova_4@mail.ru

3. Senior Lecturer of the Department of Informatics and Computer Engineering, North-Eastern Federal University named after M.K. Ammosova, Yakutsk, faith_ykt@mail.ru

4. Candidate of Pedagogical Sciences, Associate Professor, Director of Namsk Pedagogical College, nik-alena-168@mail.ru

5. Candidate of Pedagogical Sciences, Associate Professor of Informatics and Computer Science Department, North-Eastern Federal University named after M.K. Ammosova, Yakutsk, prokopievmisha@mail.ru

6. Doctor of Philology, Associate Professor, Leading Researcher of the Institute of Humanitarian Studies and Problems of Small Peoples of the North of the SB RAS, anastmureeva@yandex.ru
