INCREATING THE INFORMATION COMPETENCE OF TEACHERS IN YAKUTIA RURAL SCHOOLS THROUGH PROFESSIONAL DEVELOPMENT COURSES

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INTRODUCTION

Adaptability is a characteristic feature of the modern system of general education. This reflects the new technological paradigm and digitalization of all aspects of human life. Russia is updating the goals of high-quality education in line with international standards, and the social responsibility for the learning outcomes is growing. As a result, teaching is becoming more difficult. Therefore, the state aims to create an integral system that would ensure the professional development of educators in general and teachers as the largest group, in particular.

The objectives of the national system for teachers’ professional development include: 1) creating a system of institutions and mechanisms that ensure continuous professional development, 2) introducing a certification system for the heads of educational organizations, and 3) supporting young teachers under the age of 35 (SERGEeva et al., 2019).

Studying online education, we relied on the research papers of such international authors as S. Garcia-Mateus and D. Palmer (2017) who considered the issue of bilingualism and noted that the pedagogy of linguistics plays crucial role in developing a positive identity in bilingual education. Researchers N. K. Akhtayeva, B. D. Zhumakaeva, B. Sagdyndykuly, G. Sagnaeva, and G. Bayaliyeva (2017) focus on teacher training within the context of language learning. In addition, we would like to mention the paper of M. Rüth and K. Kaspar (2017), who claim that e-learning and the related research are generating an increasing amount of evidence and contexts within various subjects.

At the same time, researchers have not fully explored the essence and specifics of the digital educational environment regarding the teaching methods of academic disciplines. The research problem stems from the fact that one of the objectives of modernizing Russia’s national and regional education is organizing training courses aimed at the development of digital competencies, which would contribute to the successful implementation of remote and blended education in rural areas. These problems determined the research goal: to substantiate and devise professional development courses to increase teachers’ information competence within the educational environment of rural schools in Yakutia. For this purpose, we analyzed Russian research papers with the focus on the following:

- Applying e-learning technologies to teaching academic disciplines at schools and universities;
- Preparing future teachers to use e-learning in rural schools;
- Providing e-learning courses for the educators in the northern regions;
- Substantiating the significance of training teachers to use software and online platforms in Arctic schools;

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Increasing the information competence of teachers in Yakutia rural schools through professional education and interaction with ethnocultural environments in the circumpolar conditions.

- Highlighting the importance of speech culture in preserving the national identity of the individual;
- Ensuring ethnocultural education of future teachers who will work at schools of indigenous peoples of the North;
- Analyzing the didactic potential of using electronic information and educational environment.

These issues were considered by E. A. Barakhsanova and E. Z. Vlasova (2019), S. V. Goncharova (2017), M. P. Lapchik (2013), N. D. Neustroev (2015), S. I., Osipova, O. V. Prikhodka, and A. I. Bogdanov (2019), M. S. Prokopiev (2014), M. A. Sorochinsky (2018), and others.

**LITERATURE REVIEW - ANALYSIS OF THE RUSSIAN SCIENTIFIC AND PEDAGOGICAL LITERATURE**

In this study, we analyzed the formation of the educational information environment of schools as an integral socially significant multi-level system. Its participants are students, schoolteachers, and the employees of the republic’s education system. The research methodology can be used by the republican educational organizations of all levels as it ensures the interaction of all parties of the educational process through the implementation of educational programs and services relevant for potential customers. The informatization of education in Yakutia’s circumpolar conditions was considered by Z. S. Zhirkova (2018), M. P. Lapchik and A. K. Tarym (2012), and in publications in international journals (BARAKHSANOVA, BARAKHSANOVA, OLESOV, MALGAROV, NEUSTROEV, 2020; VLASOVA et al., 2020; BARAKHSANOVA et al., 2017).

The introduction of remote learning as the result of the constantly increasing requirements for the level of information and professional competence of students and schoolteachers are considered in the papers published in various international journals (PROKOPYEV, VLASOVA, TRETYAKOVA, SOROCHINSKY, SOLOVIEVA, 2020; TRETYAKOVA, BARAKHSANOVA, PROKOPYEV, SOROCHINSKY, VLASIVA, 2020; VLASOVA, BARAKHSANOVA, GONCHAROVA, ILJINA, AKSYUTIN, 2020; KOSTIKOVA, KUZIN, GOTSKAYA, AVKSENTIEVA, PROKOPYEV, 2020).

In their papers, regional authors examine the prerequisites for the formation and development of a multinational school in the Russian Federation on the example of a national region (Vlasova et al., 2018), ethnocultural education of future teachers in schools of indigenous peoples of the North (VLASOVA, BARAKHSANOVA, GONCHAROVA, ILJINA, AKSYUTIN, 2020). They present a methodology for the formation of meta-competence of bachelor students in the IT course through project-based learning (LAPCHIK and TARYMA, 2012). Thus, the pandemic has opened up new opportunities for using electronic resources and digital education platforms when organizing the remote access to education. This is largely because lectures and practical classes were conducted online.

M. Olsson, P. Mozelius, and J. Collin (2015) revealed that students’ self-control and motivation are crucial in online education in the fields of programming and gamification. The research presents the models of the lectures visualization prototype and assessment methods. The results of the assessment show that visualization by progress indicators is a good way to improve the courses’ quality and allows creating online environments with rich and versatile content. The high level of visualization makes it easier for students to perceive the content of the courses. However, it is not easy to assess them, since each participant has a different learning style and different visualization needs. Visualization software holds promise for improving programming education in the 21st century.

T. Almpanis (2016) focuses on the future development of e-learning (Heads of e-Learning – HeLs), in particular, the technology of enhanced learning (TEL) created in the UK. The work expands the methodology aimed at studying e-learning and conclusively proves the great potential of blended methods and approaches. According to the HeLs expert, digital skills and competence of teaching staff, as well as their institutional culture, are an effective way to implement TEL. Indeed, educators, scientists, and practitioners point out the increased efficiency of this learning technology Hatzipanagos, Gregson, 2015)}.
The researchers note that at the University of London, remote learning means access to available educational resources. The study revealed some possibilities, and its findings are useful for both practitioners and students in the field. S. S. Noesgaard and R. Ørngreen (2015) examined and studied the effectiveness of e-learning through an integrative survey. The authors found 19 different ways to measure its effectiveness, the most common of which is the “learning outcome,” which appears in 41% of the articles analyzed in the literature review. J. Costley and C. Lange (2016) believe that the significance of instructional design stems from its ability to establish discourse, context, and content of online learning.

MATERIALS AND METHODS

The study involved 600 teachers of rural schools from 32 uluses of the republic. Table 1 shows the number of teachers in rural schools who did professional development course “Electronic Information and Educational Environment in the Work of a Modern Teacher.” The participants were divided into several age groups: 25-30 years old, 31-40 years old, 41-50 years old, 51-60 years old, and over 60 years old. The study covered the period from 2019 to 2021.

Table 1. Age composition of rural schoolteachers who can work remotely.

| Age      | The number of teachers | Ability to teach remotely |
|----------|------------------------|---------------------------|
| 25-30    | 210                    | 70%                       |
| 31-40    | 90                     | 30%                       |
| 41-45    | 75                     | 25%                       |
| 46-50    | 60                     | 20%                       |
| 51-55    | 60                     | 20%                       |
| 56-60    | 45                     | 15%                       |
| Over 61  | 60                     | 20%                       |
| Total    | 600                    | 39%                       |

Source: Search data.

To analyze the implementation of remote learning during the pandemic, we surveyed the teachers in rural schools regarding the use of modern educational technologies in their work activities. The survey was conducted online.

Since 2019, the Ministry of Education and Science of the Republic of Sakha (Yakutia) has been providing Internet access to socially significant objects through a single data transmission network in 505 secondary schools and colleges (Table 2).

Table 2. The number of Yakutia’s schools and colleges with access to high-speed Internet by years.

| Region                        | 2019 | 2020 | 2021 |
|-------------------------------|------|------|------|
|                               | schools | colleges | schools | colleges | schools | colleges |
| The Republic of Sakha (Yakutia) | 126     | 14      | 145     | 6        | 206     | 8       |
| Total                         | 140    | 151    | 214    |

Source: Search data.
RESULTS

The results of the survey among teachers in rural schools confirmed the importance of professional development courses that form the information competence of the teaching staff and reflect the specifics of the educational environment in a rural school. The professional development course for the teachers in rural schools included the following:

- At the preparatory stage, to form student groups, we studied the level of digital competence of rural school teachers and took into account their age;
- At the formative stage, learners increased their knowledge on the use of modern educational technologies, distance learning tools, and the organization of the educational environment of a rural school;
- At the final stage, upon course completion, we verified the results of the study.

The main criterion proving the effectiveness of the conducted professional development course was the practical knowledge and skills gained by the teachers of rural schools related to the application of modern educational platforms and e-learning tools. Table 3 shows the mastery of the information competence by the teachers as they created projects for various subjects (Table 3).

Table 3. The indicators of the increase in the teachers’ information competence, %.

| Competence criteria                                                                 | Result (%) |
|------------------------------------------------------------------------------------|------------|
| 1. To be able to use the database in the educational process                       | 72.8       |
| 2. To be able to present multimedia information in a synchronized form             | 63.2       |
| (within a single digital educational ecosystem)                                    |            |
| 3. To apply interactive forms of education using AR, VR laboratory, interactive games, etc. | 40.2       |
| 4. To be able to create an educational ecosystem (educational content) in a digital environment | 78.5       |
| 5. To know standard techniques for building the educational process using innovative technologies, social media resources, mobile applications, and programs. | 78         |
| 6. To understand the different levels of digital literacy and opportunities when planning the learning process | 82         |
| 7. To be able to comprehensively assess the level of digital literacy of each student in the learning process | 42.3       |
| 8. To be able to organize a blended form of education using various innovative technologies and teaching methods | 50.3       |
| 9. To understand problems and difficulties that may occur when organizing a blended form of education | 62.3       |
| 10. To use digital technologies as feedback in the educational process              | 68.9       |

Source: Search data.

During the diagnostic testing, the teachers demonstrated an average level of information competence. They had the lowest score for criteria “To apply interactive forms of education using AR, VR laboratory, interactive games, etc.” and “To be able to comprehensively assess the level of digital literacy of each student in the educational process,” for which slightly more than 40% of the teachers showed positive results. At the same time, 49.7% of the teachers had difficulties with the tasks of the criterion “To be able to organize a blended form of education using various innovative technologies and teaching methods.” Since teachers of rural schools have different levels of information competence, we identified three levels (critical, acceptable, and productive) for seven age groups.
The Diagram 1. The level of the information competence of the teachers in rural schools, after completing the professional development course, %

| Group | 25-30 years old | 31-40 years old | 41-45 years old | 46-50 years old | 51-55 years old | 56-60 years old | Over 61 years old |
|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| 1     | 24.5            | 36.3            | 45.3            | 44.6            | 50.4            | 58.4            | 40.0             |
| 2     | 23.5            | 40.2            | 50.4            | 44.6            | 1.6             | 58.4            | 40.0             |
| 3     | 5               | 47.3            | 50.8            |                 |                 |                 |                  |
| 4     |                 |                 | 31.6            | 68.4            |                 |                 |                  |

Source: Search data.

We analyzed the information competence formation during the component assessment and identified a positive trend among all groups. At the same time, it was most visible in Group 1 (from 25 to 30 years old).

The efficiency of the professional development course manifests itself through the fact that the teachers more actively used remote learning during the pandemic, the results of which are presented in Diagram 2.
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Diagram 2. The decrease in the uncertainty when implementing remote learning during the pandemic.

Source: Search data.

The study results prove the decreased uncertainty in the implementation of remote learning during the pandemic. For instance, the average barrier decreased by 15.18%, and the ability to apply information technology increased by 28%.

DISCUSSION
To increase the effectiveness of remote learning with e-learning technologies in Yakutia schools, one should consider the specifics of the educational environment in rural schools and certain factors (ALASMRI et al., 2019). These include creating facilities and resources, increasing IT competence of teachers, developing and creating electronic resources for academic disciplines, assessing the levels of information competence of schoolteachers, and the socio-cultural and accessible focus of information competence of future teachers, reflecting the specifics of the educational environment of rural schools in Russia’s regions (KUSTONO, 2021; ANING and BAHARUM, 2020).

The most common way to estimate performance is the quantitative measurement with pre- and post-analysis, which involves empirical research on e-learning solutions for science teachers that is a valuable contribution to literature review.

We believe that it might be difficult to incorporate remote learning into schools as teachers may use several strategies to avoid significant changes in their work practices. In addition, only the timely organization and implementation of professional development courses devised according to the level of the information competence of teachers in rural schools will contribute to improving the quality of education.

CONCLUSION
The implementation of remote learning in rural schools of Yakutia depends on the IT training of future teachers in Yakutia’s pedagogical universities. Another significant factor is the consistent methodological work, during which any educational institution and university can interact with any educators, exchanging ideas about the development and creation of new electronic resources for academic disciplines, in accordance with the specifics of the regional educational environment. This requires a sufficient knowledge on how to use modern educational technologies and can be successful only if such activities reflect the national and regional component when forming teachers’ information competence in Russian universities.
We theoretically substantiate the significance of increasing the information competence among teachers in Yakutia’s rural schools through professional development courses. The region should improve the work of educational organizations in terms of choosing innovative approaches and principles of online learning. The practical significance of the research findings is associated with the ability to implement organizational, pedagogical, monitoring activities and to facilitate the selection of technological and methodological support of the educational process in rural schools that are looking for new forms of working with students and parents. This makes it possible to construct a new model aimed at solving the tasks set during the implementation of e-learning through technologies and means of remote education.

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Increasing the information competence of teachers in Yakutia rural schools through professional development courses

Aumento da competência de informação dos professores das escolas rurais de Yakutia através de cursos de desenvolvimento profissional

Aumento de la competencia informativa de los maestros en las escuelas rurales de Yakutia a través de cursos de desarrollo profesional

Resumo

O objetivo da pesquisa é considerar o processo de desenvolvimento da competência da informação dos professores das escolas rurais de Yakutia necessárias para o ensino remoto durante a pandemia. Os principais métodos de pesquisa são o método de avaliações de especialistas e processamento estatístico de resultados de pesquisas quantitativas. Mais de 600 professores de 32 uluses da república participaram do experimento e fizeram os cursos de desenvolvimento profissional. A esmagadora maioria das escolas em Yakutia são rurais (mais de 70%), uma vez que estão localizadas em assentamentos rurais. Os autores elaboraram a metodologia de ensino para aumentar a competência da informação dos professores das escolas rurais. A abordagem proposta implica a continuidade dos cursos de desenvolvimento profissional. A pesquisa realizada entre os professores demonstra de maneira concluyente a necessidade de levar em conta as especificidades do ambiente educacional das escolas rurais, ao mesmo tempo em que desenvolve a competência informativa dos professores durante a pandemia.

Palavras-chave: Competência da informação. Escola rural. Ambiente educacional. E-learning. Formação de professores.

Abstract

The research goal is to consider the process of developing the information competence of teachers in rural schools in Yakutia required for remote teaching during the pandemic. The main research methods are the method of expert assessments and statistical processing of quantitative research results. Over 600 teachers from 32 uluses of the republic took part in the experiment and did the professional development courses. The overwhelming majority of schools in Yakutia are rural (over 70%), since they are located in rural settlements. The authors devised the teaching methodology for increasing the information competence of teachers in rural schools. The proposed approach implies the continuity of professional development courses. The survey conducted among teachers conclusively demonstrates the need to take into account the specifics of the educational environment of rural schools while developing the information competence of teachers during the pandemic.

Keywords: Information competence. Rural school. Educational environment. E-learning. Teacher training.

Resumen

El objetivo de la investigación es considerar el proceso de desarrollo de la competencia informativa de los maestros en las escuelas rurales de Yakutia requeridas para la enseñanza remota durante la pandemia. Los principales métodos de investigación son el método de evaluación de expertos y el procesamiento estadístico de los resultados cuantitativos de la investigación. Más de 600 maestros de 32 uluses de la república participaron en el experimento y hicieron los cursos de desarrollo profesional. La inmensa mayoría de las escuelas de Yakutia son rurales (más del 70%), ya que están ubicadas en asentamientos rurales. Los autores idearon la metodología de enseñanza para aumentar la competencia informativa de los maestros en las escuelas rurales. El enfoque propuesto implica la continuidad de los cursos de desarrollo profesional. La encuesta realizada entre los docentes demuestra de manera concluyente la necesidad de tener en cuenta las especificidades del entorno educativo de las escuelas rurales al tiempo que se desarrolla la competencia informativa de los docentes durante la pandemia.

Palabras-clave: Competencia informativa. Escuela rural. Entorno educativo. E-learning. Formación del profesorado.