Physical and digital accessibility of education in sparsely populated regions during the COVID-19 pandemic: case study of the Yakutia, Russia

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ABSTRACT

The population's well-being and the decent life quality is mainly determined by the social infrastructure accessibility. The Sakha Republic (Yakutia) covers a vast territory, and it is the largest region of Russia. The occupied area is 3.1 million km². As of January 1, 2021, Yakutia has a population of 982,000 people. The inaccessibility of settlements and harsh climatic conditions require the most comfortable placement of social facilities for the population. According to the Law of the Sakha Republic (Yakutia) of October 4, 2002 No. 47-Z N 429-II "On the List of Inaccessible and Remote Areas in the Sakha Republic (Yakutia)" 185 settlements and 163 work sites are recognized as inaccessible and remote areas.

At the present stage, in the Sakha Republic (Yakutia) there is a weak development of the transport system and a low accessibility to social services. All this leads to a decrease in the life quality and standard of the population. Moreover, the settlement of the population has changed significantly. Urbanization, the population drift from small to larger settlements, from larger settlements to the city of Yakutsk has led to the fact that in a significant number of small settlements the infrastructure is excessive, and in the large, migratory attractive settlements it is insufficient. This gives rise to a response in the form of the planned social infrastructure institutions optimization. The population density in the Sakha Republic (Yakutia) in 2021 is 0.32 people / km². In the central regions and towns this indicator ranges from 0.27 to 2.85 people / km², and in the remote areas from 0.01 to 0.15 people / km².

The current socio-economic situation in the country and in the education system is such that traditional forms of getting education and teaching models cannot meet the needs for educational services which are usually concentrated in larger cities.

At the moment, there is an uneven distribution of the students, and overcrowding in general education institutions in the central part of the Sakha Republic (Yakutia) is still a serious problem. According to the data of 2019, 93,562 students were enrolled in 188 schools in the cities of Yakutia. Whereas 54,062 students were enrolled in 461 educational institutions in the rural areas of the Republic. From 2016 to 2019, 35 schools were commissioned in the Sakha Republic (Yakutia). As of 2019, the fixed assets depreciation of general education institutions is 45.1%.

Keywords: social infrastructure, population, Sakha Republic (Yakutia), education, remote areas, digital accessibility.

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1. INTRODUCTION

The life quality and living conditions of the population largely depend on the social security system development. The social infrastructure development in Russian regions, cities and settlements is a complex and multi-component process which is interconnected with the economic and investment cycles, demography, living standards and other factors. The life quality and living conditions of the population are largely determined by the social infrastructure development in the residential areas which implies the development and optimal placement of the social infrastructure institutions in all settlements of the country. The accelerated socio-economic development of the region and modernized social infrastructure facilities are reflected in the national projects and strategies. At the present time, the implementation of national projects affects all spheres of the population's life and is a key for the social benefits development. The causes for the current distortions in the social infrastructure development in the northern regions of Russia, including Yakutia, primarily lie in the moral and physical deterioration of the facilities introduced during the Soviet planning system. Active social construction was carried out from the mid-60s to the early 90s in the 20th century. During the transition to a market economy, these volumes collapsed, and only in the early 2000s began to gradually recover.

2. FEATURES OF THE MANAGEMENT OF THE SCHOOL EDUCATION IN YAKUTIA

The improvement of the project management system for social infrastructure development in the regions with poor transport accessibility should include: the data use from a long-term demographic forecast for the region, as well as the framework document; the development and introduction of standards to provide the settlements with social infrastructure facilities into the budget planning system, depending on the population, transport and digital accessibility. The inaccessible areas are only a part of a particular region. The criteria for inaccessible areas in Russia are as follows:

- significant remoteness of settlements and detached buildings, communication with these areas is carried out only by special flights depending on the actual weather;
- consistently severe weather conditions (heavy winds, heavy rains, the beginning of ice formation, the closure of mountain passes, the lack of river crossing during the spring flood, etc.);
- lack of regular transport communication;
- instability or lack of a permanent transport connection with the settlements;
- lack of communication with reindeer herding, livestock, fishing and hunting teams, geological parties, mines and meteorological stations.

The features of such areas are inaccessibility, a vast territory and a small population which is usually settled on a large area.
Globalization calls for the development and increase of the informatization and computerization level of the population. In recent years, new technologies have been increasingly penetrating into all spheres of the society and making new demands on various sectors. The COVID-19 pandemic has made changes in the modern education system not only in the Sakha Republic, but also around the world. The education sector of Yakutia has shown its ability to quickly adapt to new conditions despite many difficulties. In the Sakha Republic, 185 settlements and 163 work sites are recognized as inaccessible and remote areas, many of them do not have the Internet access (Fig. 2).
Being a tool for innovative development, the digitalization imposes special requirements on the education system territorial constituent. This is due to the fact that individual approaches to learning are implemented primarily at the level of general education which are aimed at discovering the skills of each child in order to adapt and acquire modern digital technologies.

Distance learning is an educational process where the interaction between a student and an educator is carried out through electronic channels of transmitting and receiving information (Internet, e-mail), i.e. without the face-to-face contact between them. Like any educational process, distance learning aims to involve students in active cognitive activity in order to achieve certain educational goals for each student, that is to master a certain system of knowledge and skills. [3]

One of the tasks of a modern school is to increase the diversity of types and forms to organize the educational activities for students. Integrated with the pedagogical system of organizing educational activities, computer technologies can significantly increase the educational opportunities of schoolchildren, help them make the choice and implement individual paths in the open educational space. Nowadays, a topical issue is the desire of many schoolchildren to continue their education in those educational institutions that could provide them with a high level of training giving the opportunity to choose a specialized education. [1]

The educational environment in Yakutia is focused on strengthening the digital constituents of education, increasing the quality of educational services, expanding the content and forms of education, including online technologies. In the general education institutions of the Sakha Republic the following Internet-resources are used to increase the students' interest in academic subjects: infourok.ru, Statgrad, sdamgia.ru, interneturok.ru, Portals to hold distance competitions and Olympiads for schoolchildren: mega-talent.com, mir-olimpiad.ru, konkurs-lisenok.ru, olimpiada.ru, British Bulldog, YaKlass, etc.

There are 652 general education institutions in the Republic, of which 632 are municipal (state) day institutions, 15 are evening and 7- non-state institutions which are attended by 147,624 students (data of 2019).

Fig. 3. Map of the students’ number
The number of students studying in general education institutions in the Sakha Republic (Yakutia) for the period from 2016 to 2019 has a growing trend. The number of students increased by 4.9% and amounted to 147,624 students in 2019, in contrast to the indicator of 2016 when the number of students was 140,861.

In the central part of Yakutia, there is an overcrowding of general education institutions. In total, there are 188 schools in the urban settlements of Yakutia, and 461 in rural areas according to 2019 data.
As can be seen in the figure, there is a decrease in the number of schools in the Republic. In 2019, 140 educational institutions were connected to the Internet in the Republic, in 2020 — 151 institutions, and in 2021 — 214 educational institutions. At the moment, there are four types of the Internet connections in educational organizations of the Republic: using satellite communications (used by 30% of institutions of the Republic), using fiber — optics communication (61% of institutions) and wired connection via telephone line (7% of institutions). In addition, there is wireless broadband access which is used by 2% of educational organizations.

In April 2020, taking into account all the main factors necessary for the uninterrupted educational process in all settlements of the Republic, the Ministry of Education and Science of the Sakha Republic developed methodological recommendations for distance learning. The mechanism of organizing distance learning was explained in detail: general principles, recommended electronic educational resources, functional responsibilities of a principal, vice-principal, teacher, and standard local regulations were given. The educational process organization is presented according to 4 models that take into account the Internet access and computer equipment of students. (Appendix 1)

Learning models for schoolchildren in the Republic (depending on the technical conditions: the Internet access and computer equipment of a student):

1. Organizing the teaching process of a student in the favourable environment (with the Internet access and a computer, laptop, tablet or smartphone).
2. Organizing the teaching process if a student has the Internet access and does not have a computer (laptop, tablet or smartphone).
3. Organizing the teaching process if a student has a computer (laptop, tablet or smartphone) and does not have the Internet access.
4. Organizing the teaching process if a student does not have the Internet access, a computer (laptop, tablet or smartphone).

3. CONCLUSIONS

Thus, in the Sakha Republic (Yakutia), there is an uneven development of the general education infrastructure, and it is needed to expand the network of children's technology parks, laboratories, centers for modern skills, technical creativity and others for children living in rural areas and small towns. It is also necessary to update the educational practices and educational technologies that will ensure the development of students' basic skills and will increase their motivation to learn and their involvement in the educational process. The Ministry of Education
and Science of the Sakha Republic (Yakutia) sets the following tasks to improve the digital skills of students and teachers:

- Introduction of the "We are the Future of Russia!" project in all municipal and urban districts.
- Introduction of the "Erkeei-2" education program based on ethnopedagogy.
- Increase in the number of consulting and methodological centers to provide services to families with children (2019-410) and to provide 10,000 professional services of psychological, pedagogical, methodological and advisory assistance to parents and guardians.
- Equipping 11 early intervention services with special gaming and computer equipment.
- Creating 42 "Point of Growth" centers for digital and humanitarian education.
- Creating "Quantorium" mobile technopark.
- Updating facilities and resources for physical education and sports in 38 rural educational institutions.
- Stimulating the mechanisms of public-private and social partnership and involving non-governmental organizations in the children's additional education sector development.

In the foreseeable future, the following prospective ways to solve the issues are emerging:

1) For small settlements (with the population up to 10,000 people). A rational and efficient way to construct new buildings in the form of multifunctional centers that would unite several organizations in one building at once;

2) The development of technologies, as well as providing the full Internet coverage of our territory, can stimulate wider spatial settlement. Foreign researchers speak about the gradual formation of the post-urban world model. Therefore, taking into account the future demand of both the region and the country as a whole for food production, it is worth preserving a fairly significant share of the rural population which currently accounts for 35% of the total number compared to 25% in Russia as a whole. However, it is necessary to plan in advance how to ensure equal access and quality of basic social services for the population in these conditions.

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