

ECQEMC 2021**The Fourth Annual International Symposium “Education and City: Quality Education for Modern Cities”****THE CHANGES IN DAILY SCHOOL COMMUTE IN THE
CONTEXT OF PANDEMIC**

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Abstract

Life in a modern metropolis offers a massive number of opportunities, including a variety of educational trajectories for children. To select a school, a family needs to solve a complex equilibrium between the school characteristics, the family expectations, and the geographical factors. Daily commute to school and back home has a serious impact on the lives of schoolchildren. Taking the autonomous territory of the Moscow metropolis as an example, we reflect on the effect of pandemic restrictions and lockdowns on the daily mobility of schoolchildren. Based on data from more than 35 thousand students living and receiving education on the local territory, we analyzed the age and territorial distribution of students, as well as their mobility under the conditions of a natural experiment caused by COVID-19. The study shows the picture of daily mobility of schoolchildren before and during the COVID-19 lockdowns and explores the possible delayed effects on students' mobility in the future, connected with the development of remote technologies which allow access to better educational products without the geographical limitations.

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1. Introduction

The topic of students' school choice and daily urban mobility is vital for the city management. Studies show connections between the school characteristics and the property values in the surrounding districts (Bonilla-Mejía et al., 2020; Turnbull et al., 2018). On the other hand, in the places where public school choice is available, this connection is weaker and parents actively exercise the option of selecting a school outside their assigned district (Owens, 2020; Söderström & Uusitalo, 2010). Although these studies focus on the USA context, there are studies that show the similar effects in other countries, for example in Germany (Schwarz et al., 2017), Finland (Varjo & Kalalahti, 2019), and Russia (Mishura et al., 2019). The development of urban territories should consider the number of families with children and their educational needs, including not only the families that live in a certain neighborhood, but also those children who travel daily to these territories for educational purposes. Some families prefer to send their children to the school next door, while others prefer more distant options. There are studies that try to explore the factors of school choice, and some of them conclude that the quality of education is the major driver for such choice (Bayer et al., 2007; Candipan, 2020). Nowadays, there are more active and informed parents who are ready to participate in the dialogue with school and district officials and try to improve the situation "from within" (Hill, 2018).

The geography of the school location plays an important role in the process of the school choice, however the connection between the locale and the choice is not linear, it is a complex equilibrium between the school characteristics, the family expectations, and the geographical factors (Cantu et al., 2021; Khalid et al., 2021; Ved & Pramod, 2021). Bell (2009) identifies three more factors that are important in this equilibrium: the transport accessibility, the family dynamics, and the information (or believes) about schools and neighborhoods. Other authors also highlight the importance of the transport system to the school choice, for example, one study demonstrates that school bus eligibility increases the likelihood of choosing a school by 12-30 percent in the cases, when school distance is significant (Trajkovski et al., 2021). Another study shows the connection between the public transportation and student absenteeism, arguing the importance of transport availability for educational outcomes (Stein & Grigg, 2019). Furthermore, students who experience difficulties in daily commutes to school are more likely to transfer than their peers in the same school with less difficult commutes, and if they do, their new schools are substantially closer to their homes (Stein et al., 2021).

The vital topics of life and health safety are of great importance for families whose children must commute daily for longer distances. In a situation, when families choose between the quality of education and the accessibility of school location, 51.3% of respondents point to the importance of safety problems for the life and health of a child in public transport (Nekhorosheva et al., 2021). Parents' anxiety about leaving a child out of control arises from a lack of trust to the public services and to the child's capacity to navigate the system. Both, the child's behavior, and the unreliability of urban environment can cause such concerns. Longer commute can influence the children's physical and psychological well-being by causing more physical and psycho-emotional stress. It can violate the daily routine and the organization of meals. Furthermore, it can reduce the time for live communication with loved ones, replacing it with the remote communications in social networks. Thus, transport accessibility is related not only to the physical

organization of urban space (roads, parking spaces, public transportations), but also in psychological well-being during the commute and the personal perception of travel time (Parthasarathi et al., 2013). Thus, these are the key factors for improving the life quality for families whose children participate in daily urban life as passengers of public transportations (Anderson, 2017).

The COVID-19 pandemic brought new challenges to the daily commutes of students, reflected in (1) the decisions of city authorities regarding the school attendance and restrictions of movements certain groups of the population using administrative and socio-economic mechanisms and (2) the development of distant educational services which are not anchored to a certain geographical location. In this paper we will explore the changes in daily urban mobility of schoolchildren during the COVID-19 lockdowns in 2020-2021 based on the example of Moscow city. In Moscow, there were two major waves of lockdown restrictions, in the beginning of the year (March 5 - June 9, 2020) and in the end (October 12, 2020 - January 18, 2021). Both middle and secondary schools were transferred to the remote format and students were bound to remain at home. Their transport cards were blocked, limiting their access to public transportations. Meanwhile, younger children were allowed to continue attending schools in person and to study as before.

The administrative measures during the COVID-19 lockdown can be described within the framework of institutional paradigm. However, in this research we will review these changes within the new mobility paradigm (Sheller & Urry, 2016) which discovers and describes the new forms of mobility, integration and exclusion in the new reality which goes beyond the concepts of physical place and movement. Thus, we can move beyond the frameworks of institutional sociology and describe the everyday mobility practices in the terms of the quality of presence and co-presence, affective manifestations, and life stories that shape the personal experience and interpretation of the world.

2. Problem Statement

Daily mobility of students should be explored in the three-dimensional model, where the characteristics of a person, a school and an urban space interconnect and affect each other. The research problems are born in their interaction. In this study, we explore the relationships between person and school, between school and city, and between person and city. In these relationships we can see why people select some school, what are the characteristics of this school, what makes it attractive to some family. On the other hand, we explore the territorial accessibility of educational organizations, urban planning, and its role in urban ecosystem. This model helps to consider different factors of this ecosystem and helps us to explore the problem from different perspectives.

In Russia, cities are divided into administrative territories, and the schools are assigned to these territories. In such system, children from the school neighborhood have a priority admission to it. However, a school can decide to open more classes and to enroll more students, but only after enrolling all the candidates from the assigned district. For the top-tier schools, it creates a situation, when some parents are willing to move closer to the school to ensure a place for their children, which leads to the development of the surrounding territories, the increase in house prices and so on. It shows that schools are extremely connected to the city landscape both ways, as they are affected by it, but also, they are shaping it.

3. Research Questions

The first research question of this study focuses on the characteristics of daily student mobility of schoolchildren in one of the administrative districts of Moscow city. Next, we compare this picture with the situation during the COVID-19 lockdown, demonstrating the differences and the impact of the restrictions. However, these restrictions also created an opportunity for the development of modern technologies of remote education. We explore, what new educational products appeared on the market and how it can change the educational landscape in the future? And finally, we discuss what are the possible consequences for daily educational mobility of students.

4. Purpose of the Study

The purpose of this study is twofold. On the one hand, we describe the characteristics of students' daily mobility in a "regular" situation. On the other hand, we discuss the impact of the COVID-19 lockdown to the daily mobility and explore the possible delayed effects on students' mobility in the future, connected with the development of remote technologies which allow access to better educational products without the geographical limitations. This shows the possible scenarios for the future development of everyday mobility of students.

5. Research Methods

To answer the research questions, the study combines quantitative and qualitative methods. This study is based on the data retrieved in an administrative district of Moscow city. In Moscow, schools are merged in large educational complexes, not always geographically united. These educational complexes educate children from 2 to 18 years, and include pre-school (before 7 years old), elementary school (7 to 10 years old), middle school (11 to 14 years old) and secondary school (14 to 18 years old) levels of education. In total, there are 16 educational complexes in territory, each includes from 1 to 20 buildings, the total of 116 buildings. The data includes more than 35000 students, their places of residence and the locations of the schools that they are attending, which allows us to analyze their daily travels. We analyze this data to explore the daily distances travelled by students and compare it with the pre-COVID numbers. It shows the impact of the lockdown in the quantitative terms. To interpret this change, we use qualitative methods and describe the policies that were introduced during the lockdown, as well as the progress in the development of new technologies. It gives us an insight into possible scenarios of future development of everyday mobility of students.

6. Findings

According to our data, 58% of children study in the schools assigned by their residency, and 42% study in different districts. The proportion of the students, who select a school outside their neighborhood grows with the age and the level of education. Older students select the schools outside their residency more often: from 64% in pre-school to 50% in the secondary school. Share of students that select a school according to their residency: pre-school – 64%, 1-4 grades – 57%, 5-7 grades – 56%, 8-9 grades –

54%, 10-11 grades – 50%. We were able to retrieve the distances from children's houses to the schools they attend. The average distances from home to school in meters are shown on Figure 1. We can see that the average distance increases with the age of the students from 700 meters in pre-school to more than 1000 in the secondary school. As a rule, students use public transportation more often for long distances, while for the short distances they prefer to walk. The data shows how the autonomy of students increase with their age, as more students are travelling longer distances to commute to school. Also, older students might experience bigger pressure for better educational outcomes, as they start preparing for the universities and building their long-term life plans.

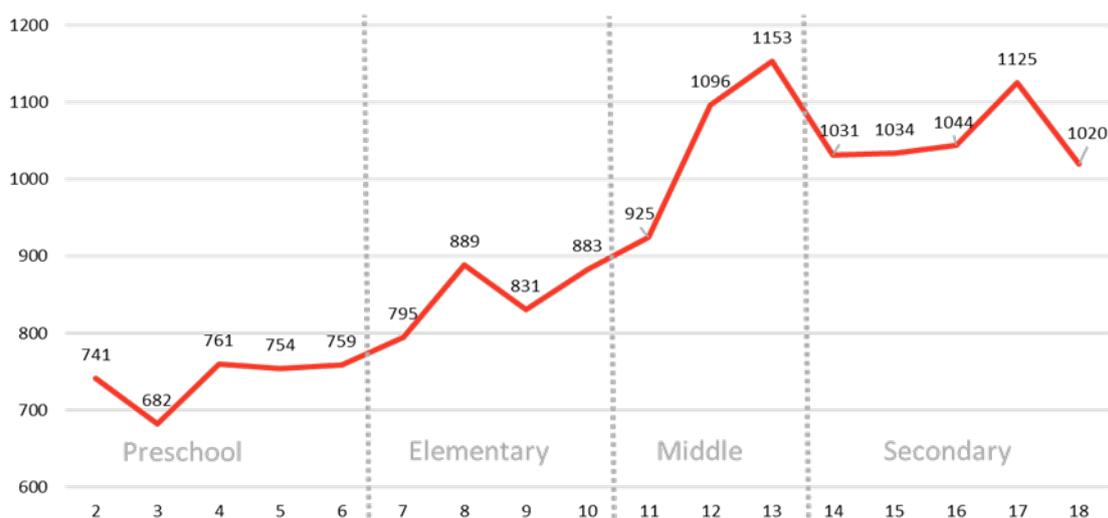


Figure 1. Average distances from home to school by age (in meters)

For many countries, last year was associated with the lockdowns, and Russia is not an exception. Starting from March of 2020, there were waves of restrictions to the social life, including education. As in many other countries, schools were closed and children were transferred to the remote education. In Russia, there were two major periods of confinement. The first period starts in March of 2020 and lasts until the end of the academic year in May, all the schools were closed and all the students were studying remotely. During the summer the restrictions were eased and some people returned to “almost” normal lives. However, in Autumn, when students had to return back to schools, only the younger students (from 1st to 5th grades) were allowed to return back to schools and to study “normally”. At the same time, the older students continued to study remotely. During the Autumn 2020 lockdown, only younger students (before 6th grade) were allowed to go to schools, older students studied at home. As a result of such measures, the total amount of students who travel daily to their schools reduced almost 3 times, from 35 thousand to 12 thousand. The number of students who travels to schools went down 64%. As a result, the travel load to urban infrastructure was reduced significantly, Figure 2 shows the total amount of meters travelled by all the students in each school daily.

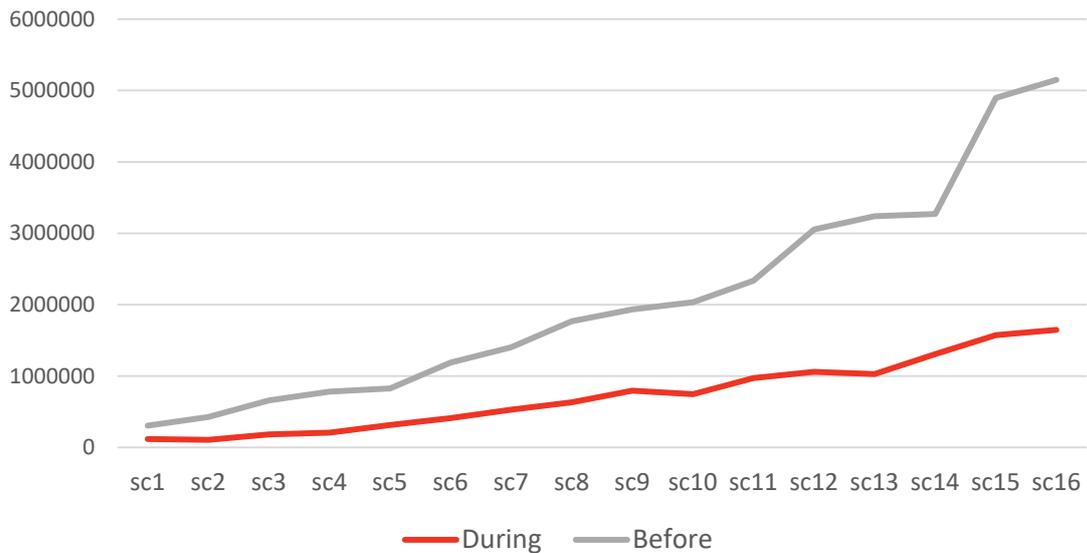


Figure 2. Total number of meters travelled by students during and before the lockdown

Figure 2 shows the difference between schools in the distances travelled by their students daily and the differences that appeared during the lockdown. We can see that the lockdown has a bigger impact on some schools, especially in absolute values. However, the average reduce in student mobility varies from 58 to 75% and doesn't correlate with the school size. The lockdown measures helped to limit social contacts not only in schools, but also on the way to schools. Also, it helped to increase social distances in public transports by reducing the amount of people using it.

Next, we explore the proportion of the students, who live far from their schools and travel longer distances daily. Figure 3 shows several categories of students based on the distances between their homes and the schools they attend. It also shows how the number of students who are travelling daily reduced during the lockdown. Important to remember, that students who are living close and very close to their schools, often don't use public transportation, thus the change in these categories had a moderate effect on the city infrastructure. However, the overall impact of the lockdown, considering the other categories, was very significant.

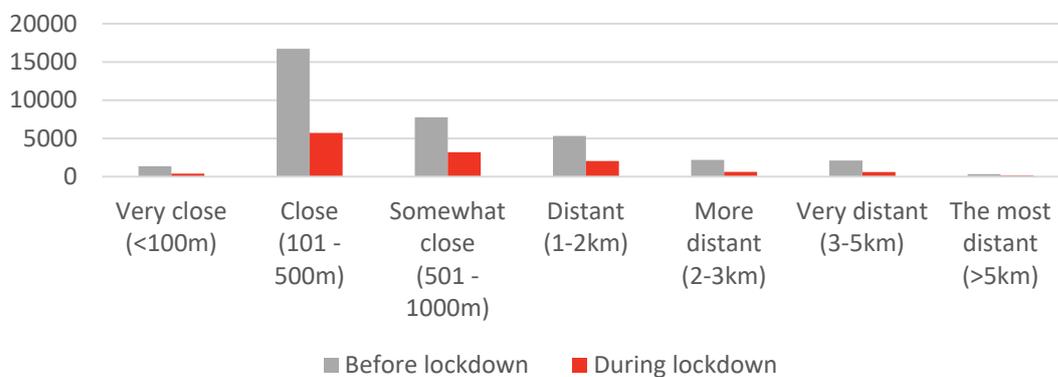


Figure 3. Number of students travelling to school daily

Next, we discuss how the decline in urban mobility is connected to the development of digital mobility. The pandemic measures were unexpected, and many schools were not ready to the new format. Therefore, in the beginning, they had struggles in the organization of the educational process. While all the schools were learning how to use digital technologies, such as zoom and teams for online classes, some of the most technologically advanced schools, companies, and experts, dominated the area and presented educational products that set the standards for the area. For example, Russian digital school and Sirius educational center presented interactive classes for all the students with the best teachers from the best schools. MOSOBRTV presented an educational TV channel for schoolchildren. Not only traditional education subjects got promoted, but also professional orientation and soft skills, for example, the projects of WorldSkills Russia and ProeKToria.

In Russia, many of the best schools are public, so the school choice is not defined by the school fees, as in some other countries. Theoretically, every student can attend these schools if they pass the entrance exams. Thus, mostly the struggle is focused on the exams and the motivation to try and to pass these exams. For many families, digital educational resources gave a unique opportunity to see the new alternatives, including the insight view to the top-tier schools. In some way, this digital experience gave an opportunity to peek behind the doors of the best schools. This experience of a “sneak peek” can motivate children to try to change their school in the future.

At the same time, many private IT companies released their educational products to the market as well. Although some of these products were developed before the pandemic, they gained a lot of popularity, support, and development because of remote education. These recourses were used not only by students, but also by their teachers and parents. Here is a short list of the most popular and influential recourses: 1C: Education; Coursera; Edu.Skyeng; Foxford (home school); Geekbrains; InternetUrok.ru; Lecta; Loftblog; Skillbox; Stepik Udemy; Netologia; New disc; Open Education; Platform «Sberbank»; Prosveshenie; YaClass; Yandex; and many others. A strong competition between these companies and products helped to improve quality and accessibility of their products. We can see that the transition to the distant education gave a huge impact to the whole area of e-learning and demonstrated the huge possibilities of digital education. With this many accessible and high-quality recourses, some families might decide to continue home-schooling after the lockdown is over. Especially it can be relevant for the families that live in some remote areas, where they have difficulties in accessing top-quality schools. And these products can be extremely relevant to children with disabilities, who have difficulties in attending the classes.

7. Conclusion

Thus, there are three possible scenarios for the future development of everyday mobility of students, and it is very likely that we will observe all of them in practice. First, many families got access to the top-tier educational products from the leading schools and teachers. After they had this experience, they might be less satisfied with their previous school, and they might decide to change a school, or maybe even a place of living, looking for better-quality education for their children. This can lead to the increase in daily mobility. On the other hand, Moscow department of education tries to develop local schools and to diversify their offer. There is a general intention, that people should be able to get high-

quality education near their places of residence, thus many schools are receiving additional support to improve their classes and to diversify their programs. They open medical, engineering, academic, IT classes and many other specialized programs to attract students. However, this process is still very competitive, and by improving their attractiveness, they will attract not only local students, but also those from the other districts, therefore even though this trend intends to reduce daily mobility, in practice it might work in an opposite direction. Finally, the digital products facilitate distant education, therefore some parents can decide to continue home-schooling after pandemic. As alternative, they can decide to stay in their local school, even it doesn't satisfy their educational expectations, but to compensate it with the digital products. We expect that the development of e-learning technologies will reduce physical daily mobility, but increase digital mobility, as students will be able to study in the leading educational organizations everywhere regardless of the place of their residence. Altogether it gives more and more alternatives to students and their families, more educational choices, and diversifies the educational landscape.

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